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NO RUBBER TRUST FOR ENGLAND.

THE latest attempt to consolidate the British rubber industry under a single control has come to naught, and we feel that the manufacturers are to be congratulated. Whatever undesirable conditions may have grown up in the rubber trade—and they are liable to grow up in any trade at some time—there is nowhere an example of a remedy for like conditions having been found in the surrender of an industry by the practical men whose energy created it to the complex and often irresponsible control of a managing board.

But it is not alone the question of control that is involved in these cases. The danger is always to be feared that industrial combinations as effected nowadays may lead to evils more grave than those from which escape is sought. Inevitably the first result of such a combination as was suggested lately in England would have led to an advance in prices, opening the way to larger importations of the products of America and Germany, and lessening the ability of British rubber goods to compete in foreign markets. It was urged, of course, that the prime object of the proposed scheme was to reduce the cost of manufacture through specialization, instead of continuing the production of the entire range of rubber goods in each of the leading factories, and through certain economies which might result from a single control. Theoretically some saving from such causes might be possible, but only when there was a consolidation of the actual assets of the leading firms, with the elimination of the least effective plant and processes. Even then the most that could be hoped for would be only enough to bring up the present insufficient profits on certain lines to an equitable basis. Such, however, would not satisfy the modern "trust" promoter.

It was a leading feature of the program which has just fallen through in England that the business should be "offered to the public"; in other words, that a very handsome sum in "ordinary shares" should be allotted to the outside financial interests involved, to pay for services rendered in floating the company. Without some assurance of dividends for these ordinary shares, at least at the beginning, they could not be disposed of to the public, and such dividends would be impossible without an advance in the prices of manufactured products to a level inconsistent with sound business policy. Nor is this all. The first preliminary to the forming of an industrial combination, as a rule, is the fixing of an exaggerated valuation upon some of the concerns in order to secure their coöperation, and, instead of anything being eliminated, there is apt to be a rush from all quarters to sell to the combination whatever may have proved unprofitable. No sooner did the proposal to combine the British rubber industry become known than new companies began to be formed, with a view to their sale to the combination—at a good profit, of course.

The gentleman who hoped at one time to bring about this rubber combination has been very successful in the spinning trade, to which he has devoted his life, and he is connected in an important way with the great cotton combination formed recently in Lancashire. But he would

have found it rather more difficult to manage a business with which he is entirely unfamiliar, besides which the various leading rubber concerns would have been found to have interests much more diverse than the different fine cotton spinners lately brought together by Mr. Scott Lings. It is further to be considered that rubber investments would be less likely to appeal to the interest of the British investing public than when Mr. Hooley still posed as a magician of finance and before a large company floated in London to plant rubber in Mexico was found to rest upon a very unsafe bottom.

We have every confidence that the rubber manufacturers of Great Britain, who have built up their industry to such important proportions, will yet be able to carry it through any temporary difficulties which may have been encountered without surrendering the control even in part to the stock jobbers. No doubt, too, they will yet applaud the attitude of a certain large company whose undeviating opposition to the proposed combine is understood to have been the principal obstacle to the success of the scheme. For, obviously, the sole purpose of these consolidations is to sell shares to the public. That is the way every dollar has been made out of the schemes thus far, and it is the only possible way to profit by them. But the craze for "industrials" is over. The public can no longer be induced to buy the shares, either in London or New York, and reputable bankers have learned to their cost that it is a perilous risk to advance money for blowing any more speculative bubbles. Witness the bicycle Trust, which started off with a capitalization of \$80,000,000, then cut it squarely in half, to \$40,000,000, then was forced to plaster the entire outfit with first mortgage gold bonds amounting to \$10,000,000, and when these were offered (after prodigious advertisement) less than \$1,000,000 were taken by the outside public. Witness, also, the utter collapse of the effort to raise \$125,000,000 with which to pay Mr. Carnegie for what is unquestionably the largest and most profitable iron and steel business in all the world. And witness, too, the scores of Trust schemes which of late have been reported by the newspapers as abandoned, because bankers refused to underwrite them.

We therefore extend our hearty congratulations to the British manufacturers upon their escape from the grave blunder into which fine phrases and plausible promises might have tempted them. And again we warn American manufacturers against the folly of turning their business over to irresponsible "promoters" who have no practical knowledge of the rubber business and who have nothing to offer but wordy promises and worthless securities. The thing has gone far enough. Now that business is prosperous and the future full of promise, everybody can well afford to await the outcome of the very harmless combinations which have already been formed in the rubber trade.

We hold that "the survival of the fittest" is the inexorable law of the manufacturing world; that the competition of able men, trained in the business, must inevitably overwhelm these unwieldy combinations; and we confidently predict a sorry awakening for the men who have been foolish enough to invest their money in "industrials."

WHERE HONEST PROFIT IS IMPOSSIBLE.

THE exploitation of crude-rubber on a large scale, in the countries of its origin, has long appealed strongly to that class of investors who are interested most easily in fields with which they are least acquainted. The supply of India rubber being tropical, the demand growing by leaps and bounds, and no practicable substitute having been found, a plausible prospectus can be prepared for a company to monopolize the production over large areas. The profits of the Belgian trading companies on the Congo are pointed to as indicating what has been done already, the 500 franc shares of one of them being quoted, it is said, at 10,000 francs. But a little reflection will suggest weak points in the rubber exploiting schemes which recent promoters have put forth, in London, particularly.

In the first place, the supply of rubber is limited only in the sense that it grows only in certain latitudes. But the same thing is true of wheat. The enormous rubber producing area now known will hardly be utilized in a century, and when the existing rubber forests do prove insufficient for the world's demands, more rubber can be obtained by planting. Much has been made of the scarcity of labor in the South American countries, and the possibility of its control by a monopoly. But there are millions of Asiatics, suited for rubber gathering and available under the "indenture" system which has worked successfully in many British colonies in the tropics. So long, therefore, as neither the trees nor the rubber gatherers can be monopolized, careful investors will be cautious about going deeply into the business of controlling rubber production. Furthermore, until the sources of supply are under control, it will be a difficult matter to "corner" rubber in the exporting markets. The French syndicate which tried to corner copper some time ago failed signally for the reason that the more copper they bought, and the higher the prices they paid for it, the more copper the mines produced.

Nor does the Belgian company afford a fair basis for comparison. All the companies on the Congo have concessions from the king of the Belgians, who is himself doubtless largely interested. Their lands cost them nothing. There is nothing to pay dividends on but the actual investment in the work of collecting and marketing rubber. The chief business of the officials of the Congo Free State is to compel the natives to work for these trading companies. If the natives in a given district fail to gather as much rubber as is expected of them, they are made to suffer. The officials go through the country with authority to punish the delinquent natives as they see fit, and, as the president of the Royal Statistical Society of London said in a recent address: "The inhabitants not infrequently fly from these harrying bands, and their villages are destroyed and possessions burned." These natives gather rubber because they cannot help it, under the most inhuman system of slavery the world has ever known. But this sort of thing can not long continue, even in Africa. The civilized world is bound to protest against it. While it lasts, however, it is not strange that rubber for

which manufacturers are willing to pay 9 francs per kilogram at Antwerp, can be laid down in that market for 3 francs and 50 centimes. The same system cannot be established in South America, nor can similar profits be made there.

All the companies "floated" in London to exploit rubber have had for their chief object the sale of shares to an uninformed public, in the manner so graphically portrayed in a current novel by Harold Frederic. The India-Rubber (Mexico), Limited, lately completed the purchase, at the reported price of \$2,800,000, of certain so-called rubber estates which the Mexican government is said to have sold a few years ago for \$1170. If those lands were covered with rubber trees—which is not the case—their whole annual product could not pay dividends on the enormous capitalization of the company, to say nothing of the cost of gathering and marketing the rubber.

THE INDIA RUBBER WORLD has printed details of many other "flotations," of a similar character, every one of which has been born of speculation, and not one of which will ever yield a profit except to the promoters and stock speculators. These are some of the reasons why this journal opposes the organization of companies in America for the same avowed object as these so-called exploiting companies abroad. Experience has demonstrated, over and over again, that it is simply impossible to control either the supply or price of crude rubber. The price is now high because the bicycle and carriage tire industries have suddenly and very largely increased the demand. But in the course of time supply is certain to overtake demand—precisely as the farmers increase the supply of wheat when prices rise. It pays to raise wheat under those circumstances. In like manner the rubber gatherers are making money, multiplying in number, and they have already enormously increased the supply.

THE ARRIVALS OF RUBBER AT ANTWERP during the first nine months of the year point to total receipts for the year of over 7,500,000 pounds, which marks a more rapid growth of development in the Congo rubber country than has been sustained in any other country for the same length of time. What is of special interest is the fact that no indication of exhaustion has yet appeared. It is possible, indeed, that the production will double year after year for a long time to come. Meanwhile no decline is evident in the rate of yield of rubber in any other country. The output from Pará is well maintained, in addition to which there is a steady growth in the exports from various other Brazilian ports, further down the Atlantic coast. It is of interest to note in the Brazilian press that twenty steamers are now under construction in British yards for the navigation of the Amazon. This fact alone indicates no lack of confidence in the future of the rubber yield of that region.

THE LITERATURE OF INDIA RUBBER.

DIE FABRIKATION DER KAUSCHUK- UND LEIMMASSE-TYPEN, Stempel und Druckplatten, sowie die Verarbeitung des Korkes und der Korkabfälle. [The Manufacture of Rubber and Glue-mass Types, Stamps, and Printing Plates; also the Working of Cork and Cork Waste.] Von August Stefan. Wien: A. Hartleben, 1900. [Paper, 12mo, 296 pp., 114 illustrations. Price 4 marks; cloth 4.80 marks.]

THIS is a second edition, thoroughly revised, of Volume 131 of the Chemical Technical Library of A. Hartleben. The

rubber stamp manufacture is a branch of the rubber industry concerning which, although it has reached large proportions, little has appeared in print of an authoritative character. Technical descriptions of this class of goods have appeared, but not fully enough to enable beginners to produce the goods without waste of time and money. The author of this work has made it his object to describe the processes of manufacture thoroughly, and in a style easy of comprehension. In the European trade there is a growing use of glycerine glue in the industries covered by this book, and formulas are given in regard to it. The manufacture of corks has become a prominent industry in some countries, and in connection with it goes the utilization of cork waste, which the author has also described fully.—We have also received from the Hartleben house a copy of "Kautschuk und Guttapercha," by Raimund Hoffer, which forms Volume 62 of the Chemical Technical Library.

IN CURRENT PERIODICALS.

India-rubber or Caoutchouc. [Review of a recent circular from the Ceylon botanic gardens.] *The Tropical Agriculturist*, Colombo. XIX:3 (September, 1899.) pp. 157-159.

Ficus Caoutchouc. By Dr. Otto Warburg. [History, varieties, geographical distribution, properties, statistics of production, cultivation in India. Several African species included.] *Der Tropenpflanzer*, Berlin. III-9 (September, 1899.) pp. 419-438.

Explanation of the Origin of *Palaequium gutta* and *P. Treubii*, reported in France by M. Raoul. *Teyssmania*, Batavia. X:3, 4 (March, April, 1899.) p. 184.

NOTICES OF THE NEW RUBBER BOOK.

CARL OTTO WEBER, Ph. D., Manchester, England, the noted India-rubber chemist and author writes:

"I have just received my copy of your book on 'Crude Rubber,' and I trust you will allow me to congratulate you upon the production of this eminently practical and comprehensive work. I feel certain that your book will contribute very considerably to the development of the chemical side of the rubber industry, *i. e.*, to the evolution of the chemical rationale of the numerous manufacturing processes which at present are exercised by rule of thumb only. We are justified to expect from such coöperation for the rubber industry the same beneficial results which metallurgy, the dyeing, paper making, and many other industries derived from it, although there exists at the present moment the difficulty of convincing rubber manufacturers of the enormous possibilities of development and progress to be found in the chemical exploration of this subject."

From Michelin & Co., Clermont-Ferrand, France, the oldest rubber manufacturing house in France:

"We have on hand your book on Crude Rubber & Compounding Ingredients, and are highly satisfied with the valuable information that it contains."

From John P. Lyons, of the U. S. Rubber Co., 9 Murray street, New York:

"I have just been reading your book on rubber. It's a perfect encyclopedia. I wish specially to compliment you on the excellent arrangement of the matter. The comprehensive index at the back and the alphabetical sub-division of many of the chapters, make it exceptionally convenient as a work of reference. To any one who is interested, even to a slight degree, in rubber manufacture, your book is invaluable. I want to add, too, that while doubtless intended chiefly for a book of reference, you have succeeded in making it exceedingly readable."

From E. Chapel, 69 Rue Caumartin, Paris, France:

"I have taken the greatest interest in the reading of this most valuable work, which is brought up in the way of a technical

encyclopedia, and, according to its well imagined divisions, is to be considered as the *vade mecum* of the India-rubber manufacturers."

From George S. Andrus, Manager, La Crosse Rubber Mills Co., La Crosse, Wisconsin:

"Herewith enclosed find check in payment for book, 'Crude Rubber & Compounding Ingredients,' which I received last night. I took this home with me and looked into it a little before bedtime and got my money's worth at once. It is a good thing and I do not see why you should not sell to every person manufacturing rubber goods."

NEW TRADE PUBLICATIONS.

THE CUSTOMS TARIFF OF JAPAN, IN EFFECT JANUARY 1, 1899. NEW York: Japan-American Commercial and Industrial Association. [Paper. 8vo. 44 pp.]

THIS schedule includes a number of classes of rubber goods, reference to which will be made in a later article on the rubber trade in Japan. Some European countries have made tariff treaties with Japan, under which their goods will be admitted at special rates, that on rubber goods being 10 per cent., *ad valorem*, and it is understood that American products will be admitted on the same terms, under a "most favored nation" clause.

THE REVERE RUBBER CO. (Boston and New York) issue a pamphlet of instructions for applying the Langmuir patent solid rubber carriage tires, the manufacture of which they have undertaken. [3½" x 6¼." 8 pages.]

ALSO RECEIVED.

Against the Dangerous Obstruction to Planters of *Ficus elastica*. By P. van Romburgh. *Teysmania*, Batavia. N-2 (February, 1899).

Cliff & Guibert Co., New York=Catalogue. Interior Fire Hose Equipment. 8 p.

Joseph Dixon Crucible Co., Jersey City, N. J.=*(a)* Making Records; How Dixon's Flake Graphite Helps. 32 p. *(b)* Dixon's Perfect Trolley Gear Lubricant. 8 p.

Tyer Rubber Co., Andover, Mass.=Tyrian Excel Nipple. 4 p.

W. D. Allen & Co., Chicago=Circular No. 16. Bowes Grease Cup. 4 p.

The Meeker Manufacturing Co., Dayton, Ohio=Ball Bearing Wheels. Solid Rubber and Pneumatic Tires. 24 p.

The Diamond Rubber Co., Akron, Ohio=The Diamond Diaphragm Tire. 6 p.

MACHINE FOR CUTTING RUBBER.

THE cutting machine of Illing and Burkart, of Zwickau, in Saxony, is especially designed for cutting rubber, celluloid, felt, asbestos, wax cloth, and similar materials. It is apparently only an ordinary knife device; but it differs from these in so far that the lever does not turn about a simple pivot, but is guided in slots. A slot-bearing is fixed to both sides of the table, so that the cloth under the knife cannot shift laterally. The cut is, therefore, always straight down, and at the same time diagonal, as in large paper-cutting machines. This arrangement holds the cloth firmly; but a modification of this machine, a combined press and cutter, accomplishes this object still more effectually. The device is again very simple. The journal glides in slotted bearings, and a toothed arc of 180° is fixed to the end of the lever. This arc engages with a vertical rack, guided in the frame of the table, so as to glide up and down. The depression of the lever knife raises the rack, which in its turn urges the press downward. The material is thus always under pressure when being cut, and no adjustment for height is needed, so that any thickness can be dealt with without previous preparation.

SOME WANTS OF THE RUBBER TRADE.

INQUIRIES.

[77] WHERE can we buy a machine for wire wrapping hose of all kinds?

[] "Will you kindly furnish us with the names of several of the best manufacturers of rolled or dry sand rolls?"

[79] "I wish to ask if there is any book published on the manufacture of hard rubber, or are all the processes involved in its manufacture held secret by the different companies that manufacture it?"

[80] "Can you tell me how many rubber factories there are in this country who are either actually engaged in or equipped for manufacturing rubber bicycle tires? Will you also tell me if possible, how many rubber factories of all kinds there are that could, at a reasonable expense and in a fairly short time be so equipped that they could take up the manufacture of such tires?"

[81] "Would you kindly advise us what rubber company is making a specialty of low grade tennis soles suitable for cheap canvas shoes?"

[82] "Kindly advise me if electrose, ruberoid, etc., can be vulcanized into sheets of, say, 3 feet by 5 feet and possess considerable strength, or strength equal to rubber. How does the cost of these materials compare with that of rubber?"

INDIA RUBBER (MEXICO), LIMITED.

AT a special meeting of shareholders held in London, on November 10, Mr. W. O. Clough, M. P., presiding, that gentleman stated that although the present board had been elected in January last, with the specific mandate to complete the purchase of the estates in Mexico from the vendor corporation (the Mexican Finance Corporation), this had not been done. On September 20, the vendor corporation had made an offer, in order to facilitate the transaction, to give up the greater part of their valuable assets, and to cancel certain debentures issued in their favor, leaving them in possession practically of only the deferred ordinary shares of the India Rubber (Mexico), Limited, ranking for dividend only after a dividend of 10 per cent. had been paid to the preferred ordinary shareholders. Mr. Clough moved the acceptance of this offer, which was agreed to. Before the vote was taken, however, several dissatisfied shareholders were heard, including one or two directors, who announced their intention to retire. One of these, Mr. Robertson, of Edinburgh, stated that, after much delay, only a few hundred pounds of rubber had been obtained from the estates, with an expenditure of thousands of pounds sterling, and the board had been informed that, owing to disease among the trees and so on, the yield would be worse next year. If the shareholders elected to pay for, instead of what they had bought, estates which were of much less area, with a mere fraction of the rubber trees stated to be on them, that was their affair.

RUBBER TIRES ON LOCOMOTIVES.—The Maine Central engineers are having a lot of fun with people along the line who are not up on machinery and locomotive building. A number of the engines have recently been fitted with new tires on the driving wheels, and they are painted a color very much resembling rubber. The engineers tell the people who are inquisitive that the engines are being fitted with rubber tires to make it easy running. The people having seen rubber tires on nearly all kinds of vehicles actually believe it.—*Augusta (Me.) Journal*.

THE INDIA-RUBBER INDUSTRY IN EUROPE.

From the Viewpoint of an American.

FIRST LETTER.

Crude Rubber Trade of Liverpool.—Auction Sales.—The Liverpool Rubber Co.—The Rubber Stores of Liverpool.—Character of the Goods Sold.—Export Trade.

IN jotting down in a series of letters a few impressions which, as an American, I may gain of the various branches of the India-rubber trade in Europe, it is not to be expected that what I may write will be new to all the readers of THE INDIA RUBBER WORLD. Still, it may be presumed that those members of the trade in the States who have not gone over the same ground may feel an interest in the same things that have interested the writer, while the European reader may possibly care to learn how much of that which is part of the established order of things with him appears unusual to a foreigner.

* * *

THESE impressions may as well begin at Liverpool, the chief crude rubber market in the world in more than one sense. New York is no mean city in respect to its rubber trade, but a considerable share of her imports have passed first through the hands of the rubber merchants of Liverpool. This is true particularly of Africans. Almost no rubber of this class has been received at New York direct from the African coasts, whereas Liverpool is the center of a great direct trade in all African products. Liverpool also is the central market for Pará rubber for Europe. There is a plan to inaugurate direct shipments from Pará to Hamburg, but the Liverpool merchants with whom I have talked do not consider the new departure important. Not only is rubber received at Liverpool from every initial market of the world, but some of it is reshipped to all the consuming countries. This situation is likely to exist until the general shipping trade of Liverpool is eclipsed by some other port, and the people here look to their magnificent docks to render this impossible throughout our time.

* * *

A FEATURE of the trade here which is not to be seen in America is the public sale of crude rubber at auction. The Liverpool auctions occur every Wednesday at noon, in the public salesroom in the Exchange buildings. The firms having rubber to offer advertise it briefly in one of the newspapers, and printed lists of the lots are sent around to rubber merchants and brokers. The latter can view the different lots in warehouse, and samples are to be seen at the seller's offices. The printed lists contain no description of the rubber; some do not even give weights, only mentioning the number of packages. About fifty persons attended the sale at which I was present, sitting on benches in a small room, while the auctioneers for the selling brokers, each in his turn, took a seat on a platform and slowly read the lot numbers, pausing after each to hear any bids. The bidders had to depend upon their memories for details as to the offerings, and naturally there was little conversation. At this sale 145 tons of African rubber were offered, and 18½ tons sold. Several small lots of other sorts also were offered, but without any sales being effected. After the sale, when I inquired of a rubber broker about the result, he replied:

"I cannot form an opinion myself until I have looked about a bit in the trade. Many lots that were bid for were not knocked down, the bids not coming up to the ideas of the sellers. But it is a rule of the trade that the seller shall not dispose of these lots by private treaty without first consulting

the highest bidders for them. Such rubber often is taken in the end by the bidders."

I may mention here that rubber auctions are held regularly also in London, on Fridays, in Mincing lane. The principal firms here have houses in both Liverpool and London, and many members of the trade journey regularly from one city to the other to attend the sales. The volume of the offerings at London is much smaller as a rule.

* * *

NOR all the rubber received in Liverpool is sold, or even offered, at these auctions. Just what advantage there is to the trade from this manner of disposing of rubber by the importers is not yet clear to me. But it appears to be the custom in Liverpool to offer imported commercial products at auction, and custom has a strong sway here. The auction sales, at various times, include bones, ivory, cottonseed, honey, chestnuts, cranberries, coffee, and a long list of other things. Mr. Grossmith, the manager in Liverpool for Heilbut, Symons & Co.—after years of experience in rubber at Pará and elsewhere—assured me that, in his opinion, no improvement could be devised in the methods of the market here. The merchants and brokers who attend the sales, after getting the rubber into their hands, dispose of it to manufacturers at home, on the Continent, or in America, just as the handlers of rubber do in New York or Boston. The British manufacturers as a rule, I believe, obtain their requirements through Liverpool or London brokers rather than from the importers. The North British Rubber Co. are understood to buy through a single Liverpool house, so that it is useless for any other firm to offer them rubber. Charles Macintosh & Co. import rubber direct from Pará when the market there is favorable, but for some time past they have found it more advantageous to buy in Liverpool. The same can be said, I believe, of David Moseley & Sons. The Silvertown company buy rubber through the brokers in Mincing lane. They are ready always to consider offers from a new source, being on the lookout for low prices, and they pursue a method for testing their purchases which I may describe in another letter.

* * *

THE growing consumption of rubber in the United States, and particularly of Africans, is appealing more than ever to the interest of Liverpool merchants making a specialty of this line. The tendency for some years has been to form direct connections or to establish branch houses, across the Atlantic, with the idea that the Liverpool firms may possess some advantage, by reason of their location, over the importers at New York. A firm not yet named publicly in this connection inform me that they have it in mind to open a branch house in the United States, but that their plans are not matured as yet. The consumption on the Continent is also growing, but that trade can be covered from Liverpool or London, without continental branch houses. Not all the European trade in crude rubber is so desirable as that of the United States, however. In Russia, for example, long credits are desired, some manufacturers there buying rubber on six months' time.

* * *

THE sentiment of the trade here is that there is enough rubber in the world to make unnecessary any alarm about the future supply, but that the increasing demand may make 4

shillings and over the ruling price for Pará sorts for a long time to come. Mr. Wright, of William Wright & Co., importers, asked me with interest in regard to rubber planting prospects in Central America and Ceylon, but most of the trade regard such considerations as of no immediate interest. It is a mooted question where rubber prices are made, but Liverpool does not claim to make them. A large manufacturer, from another city in England, expressed the opinion to me that consumers in general might be able to buy rubber for less money if it were not for parties in New York who are at work all the time to keep prices up. He did not mention any names. And a Liverpool broker asked me if it were not possible for good sized lots to be shipped to America ostensibly to fill orders, thus reducing visible stocks in Liverpool and tending to stiffen prices here and elsewhere, the lots shipped to New York to be kept in concealment for awhile and then gradually worked off at the higher prices, without the trade generally becoming aware of the transaction. I was obliged to defer an opinion.*

* * *

THE Liverpool Rubber Co., Limited, are one of the leading concerns in the English rubber industry. They date from 1859, since which time their capital has been increased materially. They have two factories—on Vauxhall road and at Walton—the latter of which is devoted to the production of rubber footwear, having been erected a few years ago for that purpose. The Liverpool company have not yet reached the rate of production of shoes of the big concern in Edinburgh, but it must be remembered that they took up this line thirty-five years later; also that snow is more frequent in the vicinity of Edinburgh than in the territory of which Liverpool is the center. During the week I spent in Liverpool, in November, though it rained every day, I failed to see a pair of rubbers worn on the street. In New York such weather would have brought out rubbers in great numbers. The people here wear heavy boots—or shoes, as Americans say—and consider them a sufficient foot covering. The dependence of this company for the sale of their footwear, therefore, is chiefly on the export trade, and for this purpose Liverpool affords an admirable location. The company have a wide range of other products in rubber, including waterproof goods, mechanical goods, and numerous specialties. The manufacture of the latter is welcomed by the rubber concerns, for the reason that such goods generally are supplied to order, and when the dies or molds are once made, the customer continues to send his orders to the same factory as long as there is a demand for the article. The company make a specialty of detachable cycle tires, in two grades. They have also been making cycles to some extent, but I understand that this is to be discontinued. They are just now bringing out a solid rubber vehicle tire, held on with a band running through the rubber longitudinally and fastened with a patented mechanical device, instead of electrically welded wires, as is the rule in America. The managing director is Mr. H. Grendon Tippet, who has been connected with the company in an important way since 1885. Mr. Tippet has visited America, and he gave THE INDIA RUBBER WORLD a cordial welcome. He had just returned from a visit to Paris in the interest of the company's business. Mr. Tippet is also an enthusiastic worker on the executive committee of the India-Rubber Manufacturers' Association.

* The temptation to corner the market for crude rubber is always a most inviting one, and the effort to do it has been repeatedly made—and as often failed. For the supply of crude rubber, like corn, oats or barley, is limited only by the demand. And whenever the speculators attempt to put up a corner against the manufacturers, the ventilation of the scheme which is sure to come through the columns of THE INDIA RUBBER WORLD will "knock the tar out of the scheme"—to use the language of Wall street realism.—[Ed.]

LIVERPOOL is well provided with rubber goods stores. Buyers of such goods in England are apt to look for them in shops devoted to their sale alone, instead of going, as in America, to shoe stores for rubber footwear, to the clothing houses for mackintoshes—or, more recently, to the "department stores" for everything. The purchasers of mechanical rubber goods in England may go for them to engineering supply houses, and the sale of druggists' sundries in chemists' shops is increasing. But the rubber shop seems in no danger of being displaced. In addition to the independent rubber goods stores, wholesale or retail or both, are the large sales depots maintained in Liverpool by the North British Rubber Co., Macintosh & Co., the Silvertown Company, and other manufacturers in the rubber line. As each of these companies produces almost the whole range of rubber goods, their stores can be stocked fully, each without going beyond the production of its own factory. The manufacturers find it conducive to trade to have branches in the principal cities, on account of the greater facility with which orders can be filled and because closer contact with customers renders it easier to give them satisfaction. Not only is the local trade important—partly on account of the great shipping interests centering here, which demand a certain amount of rubber supplies—but Liverpool is the leading point of export for British rubber goods, many orders for foreign account being filled from the depots maintained here, instead of from the factories. The manufacturers, for similar reasons, maintain depots or branches at the other principal seaports, so that any export order may be filled at the point where the shipping facilities happen to be best for that particular case. The managers of these branch houses have been promoted, I believe, from the ranks of the travelers for their firms.

* * *

In every rubber shop I have visited the sale of waterproofs has appeared the leading feature. "They are the backbone of the rubber trade in this country," said Mr. Robert J. Garrett, manager here for the North British company. There is a large demand for garden hose, also, and I am told that this is true all over the country. The demand for rubber footwear, I was told, was confined largely to seafaring men. Such as is called for in the home trade is for country use, so that I did not see a light weight rubber shoe in any shop visited. On inquiring about American rubbers in one of the stores of Hellewell & Co., I was told that these were too narrow for the English trade, as if that were an objection that might not be overcome.

Tuck & Co., the original manufacturers of what is still known as Tuck's packing, are located here, and still engaged to a certain extent in rubber. George Angus & Co., of Newcastle-upon-Tyne, who are large leather manufacturers, holding important government contracts, maintain a leather and rubber depot here, but they are not rubber manufacturers.

Cycle tires are one line in rubber which the rubber shops do not carry, with the exception of inner tubes.

* * *

So far as the rubber trade in Liverpool is concerned, it is thoroughly British. That is, there are no branch houses or agencies here for foreign makers, and no foreign made goods displayed. I have seen nothing American except some small novelty in the window of a notion shop—something I had not seen in America, and I have forgotten what it was. In front of one small rubber shop were displayed the words *Se habla español*, and this was about the only un-British suggestion I saw in the rubber goods trade of Liverpool.

H. H.

THE Williamsport (Pa.) *Sun* notes that "Williamsport rubber goods are invading England, France, and Germany.

THE TILLINGHAST PATENTS SUSTAINED.

THE most notable news feature of the rubber trade for November is the decree of the United States Court of the First Circuit on November 14, 1899, sustaining the Tillinghast Patents for the manufacture of single-tube pneumatic tires. While it has been generally known that Col. Theodore A. Dodge, as trustee of the Tillinghast Tire Association, had entered suits against infringers, the long delay that had ensued without a decision had somewhat taken the matter out of the public mind, and indeed there were those who did not scruple to say that the whole thing was a bluff, and that the taking of testimony would be continued indefinitely. The sufficient answer to these prophets is to be found in the court's decision. How far-reaching and how important this decision is to the owners of the Tillinghast patents is plainly seen when one appreciates the fact that all single-tube tires manufactured since 1893 in the United States, whether for bicycles, vehicles, or automobiles, are subject to a royalty—as well as all to be made in the future. Now that the matter is so conspicuously before the public, it may be well to review the history of the case. The patents granted to Pardon W. Tillinghast were two in number, the first being number 486,915, application filed June 20, 1892, patent issued November 29, 1892; and number 497,971, application filed September 21, 1892, patent issued May 23, 1893. The litigation, as we understand it, was based upon the latter patent, the most important claim of which reads as follows:

Claim 2. A pneumatic tire composed of a rubber tube, an intermediate layer of fabric, and an outer covering of rubber, substantially as described, having all its rubber joints and component parts simultaneously vulcanized together forming an integral, annular tire.

For some little time after the issuance of the Tillinghast patents but little was done with them. It was not until somewhere in 1895 that the inventor made any move toward having his patents respected. In that year he notified the Hartford Rubber Works Co., who were in the van as manufacturers of single tube tires, that they would be prosecuted for infringement. Colonel Pope looked into the matter and compromised by buying the patent. In December, 1895, in the United States Circuit Court at Boston, the Pope Mfg. Co. sued the Boston Woven Hose and Rubber Co. for infringement of the Tillinghast patents, the suit, however, being settled out of court. Soon after this, the Tillinghast Tire Association was formed, and consisted, it is said, of Colonel Pope, of the Hartford Rubber Works, J. Edwin Davis, of the Boston Woven Hose and Rubber Co., Col. Theodore A. Dodge, of the same company, and the representative of one other large rubber company. Since then the number of shareholders has largely increased and changed.

The matter of protecting the patents was put in the hands of Colonel Dodge as trustee. He immediately prepared a form of license in which the price of standard 28 inch tires was to be not less than \$6 per pair, in which the licensee acknowledged the validity of the patents, and agreed to pay a royalty of 25 cents per pair to the licensor. The following companies became licensees almost immediately: B. F. Goodrich Co.; Hartford Rubber Works; Revere Rubber Co.; Boston Woven Hose & Rubber Co.; Newton Rubber Works; Hodgman Rubber Co.

In connection with the licensing of these companies, there was formed what is known as "The Rubber Tire Association," which held meetings first at the Manhattan Athletic Club and later at the Arena in New York, the idea being to bring the tire manufacturers closer together and to enable them to for-

mulate plans which should do away with a variety of abuses that naturally exist in any business.

The officers of the Tire Association were: Theodore A. Dodge, president; L. K. McClymonds, vice president; G. T. Perkins, second vice president; Kirk Brown, secretary; Geo. F. Hodgman, treasurer. There was also an executive committee consisting of Geo. H. Day, J. Edwin Davis, H. C. Corson, J. F. Palmer and Henry C. Morse.

The last published list of licensees appeared in THE INDIA RUBBER WORLD in April, 1897, and contained all the names above quoted, and in addition, The New York Belting & Packing Co., Ltd., The Diamond Rubber Co., The New York Tire Co., The Mechanical Rubber Co., of Chicago; The Palmer Pneumatic Tire Co., The North American Rubber Co., The Kokomo Rubber Co., The Mechanical Rubber Co., of Cleveland; The Indiana Rubber & Insulated Wire Co., The Spalding & Pepper Co., the Peoria & Rubber Mfg. Co., The Ideal Rubber Co., The Brooklyn Rubber Co., L. C. Chase & Co., Western Wheel Works.

Five of these concerns have since gone out of business. Five of the others have been absorbed by the Rubber Goods Mfg. Co., while two of the remainder sold out to the International Automobile & Vehicle Tire Co. Some of the licenses were cancelled. This may explain in a measure why there are today fewer licensees.

Of course it is a matter of more than passing interest to the trade to know exactly in what shape the action against infringers, now certain to take place, will be inaugurated. That there were many infringers, and that they made tires by the car-load none will deny; and while speculation is rife regarding the use to which this enormous leverage on the mechanical goods business of the country will be put, until the first move is made, no one seems to be able to forecast, with any degree of exactness, the policy of the owners of the patents. The enterprise is, we believe, to be incorporated; and it is known that the Rubber Goods Mfg. Co. are working in unison with Colonel Dodge.

A number of suits were brought by Colonel Dodge, only two of which were carried through—one against the Reading Tire Co. and one against the New Brunswick Rubber Co.—both being fathered by the U. S. Rubber Co. The suits were so vigorously contested that the evidence reached several thousand type-written pages; and the decision of Judge Colt is very strong in sustaining the patent.

Whatever else may be said pro or con, no one can deny that Colonel Dodge has shown wonderful foresight, diplomacy and patience in following this matter through to a successful issue, and if his labors result in the manufacture of better tires at better prices, which is more than likely, the trade at large will have no cause for complaint.

G. C. COSSITT, of Bluefields, while in New Orleans recently, supplied the *Picayune*, of that city, with some details of the rubber planting there. He has a plantation of 43 acres, planted 10x20 feet apart, and is well pleased with the growth made by the trees. Henry Waldron, a Canadian, has 172 acres planted in rubber near by. Several other plantations have been started in the same locality—near Pearl Lagoon, on the seacoast, twenty miles from Bluefields. Land may be had from the government at \$1 (gold) per *manzana* (=1.72 acres); the surveys are made by the government at a moderate cost; the clearing costs about \$15 per *manzana*, and the average planter usually clears 100 *manzanas* the first year. Enough wild trees are found on these lands to supply the seeds needed for planting.

RUBBER AND GUTTA-PERCHA CEMENTS.

IN almost all lines of soft rubber work cement is quite extensively used. In the manufacture of goods that are cured in either open heat or steam heat, with a French chalk covering, a good cement is a recognized necessity. Where the goods are of high grade, it is customary to put a certain amount of the compounded rubber of which they are made in a benzine solution and use this for cement. But where cheaper goods are in process of construction, it is often necessary to make a richer cement, although it is always compounded so that the seams will cure equally with the rest of the article. Cements, on the whole, have not suffered by adulteration and cheapening as have many lines of compounded rubber, although the old-fashioned yellow gum used in the early days of dry heat work—consisting of 8 pounds of Pará rubber, 5 pounds of litharge, and 4 ounces of sulphur—would be deemed a needlessly rich compound. So too would the camphene be considered an extravagance when the cheaper solvent, benzine, is available.

The cements that, as a rule, are found in such text books as "One Thousand and One Secret Receipts," are taken from a variety of patented cements—English, German, French, and American—some of which are valuable, but many of which are not practical for manufacturers because of the high cost of the ingredients. At the same time, these formulas have a value in that they suggest to the practical man ingredients and combinations which otherwise might not occur to him. A review of these patented formulas shows cements made of Gutta-percha and India-rubber, for joining leather, wood, metals, glass, stone, and earthenware; card cloth, hose; for joining vulcanized rubber; for joining pipes containing fluids; for repairing vulcanized rubber goods; for backs of memorandum blocks; for belt making; for securing linoleum and tiles to decks and floors; for bookbinders; for shoemakers; for calking ships; for preserving metals; for attaching shoes to horses; together with general cements, fluid cements, marine glues, etc. The basis of all of these is either Pará rubber or Gutta-percha, while the solvents are camphene, turpentine, resin oil, bisulphide of carbon, tar oil, chloroform, ether, fusel oil, and naphtha. A variety of auxiliary gums are also used, such as shellac, mastic, styrax, pitch, gum ammoniacum, rosin, gum gamboge, and so on. A line of assistants in this work, of which practical cement men do not seem to think much, are ingredients like caseum, gluten, beeswax, isinglass, fish glue, brown sugar, and elastic glue. Many of these cements contain a modicum of sulphur, which is used undoubtedly as a dryer. For the same purpose are also used litharge, chalk, bisulphide of mercury, carburate of iron, ocher, manganese, minium, white-lead, red lead, slate dust, and pulverized alum.

Turning to the unpatented cements, the formulas for many of which are marketed by experts in these lines and are to be found on the compound books of many superintendents, it will be found as before that Gutta-percha and Pará rubber are generally considered essential. Only in the most expensive of these cements, however, is any solvent used except benzine. Asphaltum in various forms occurs in some of them, particularly in the melted cements. Shellac is also a favorite ingredient and Burgundy pitch is often used. Litharge is also used as a dryer. Cements such as those just described, however, as a rule are made by small concerns who manufacture them for special purposes, and, by selling them in small quantities, are able to make a fair profit. The real business of cement making embraces the manufacture of channel cements, imitation Gutta cements for wetting, white and black paste cements, sole laying cements, and oil proof cements. In these the rubbers used are Pará, pinky Madagas-

car, hard African, Majunga, Lagos buttons and strips, Borneo, and Fluvia. Here naphtha is the solvent always employed, and, to give tackiness to the solution, rosin, and occasionally common pitch is added. Where colored cements are called for, a very small amount of aniline, soluble in benzine, is used, the colors being black, red, blue, yellow, and green. Bone black is also often used in the production of black, and sometimes a less costly grade of lampblack is employed. When the cement business was new, it was the custom to buy the best Pará rubber and, stripping off the outer layers, reserve that for dark cements; then stripping the inner layers, soak them in naphtha until they had swelled as much as possible; after which the mass was put in a horizontal muddler which revolved until the mass was homogeneous. A little rosin was added during the muddling, and sometimes a little yellow aniline to still further lighten the color. This, by the way, is an excellent thing to remember to use with Centrals where light color is demanded. To-day the rubber as a rule is washed, but after drying it is not broken down, as that seems to prevent its swelling when mixed with the naphtha. The advantage of having a cement of rubber that is enormously swollen is that it allows of a very thin coating, which is exactly what is needed in leather work.

The manufacturer of rubber cements on a large scale has his own troubles. Aside from the constantly appreciating price of raw material, he is forever having trouble with his rubber, and trouble which he cannot guard against, because it goes back to the gatherer of the gum itself. If, for instance, in a bottle of Pará rubber there be one or two layers which are imperfectly cured and which would be all right in any other line of work, they make trouble for the cement man, for, instead of swelling with the benzine, and turning to a smooth ropy mass, these layers grain and form little nodules that are slimy on the outside, but undissolved in the center, and are exceedingly hard to reduce to a homogeneous whole.

The manufacture of double texture goods and of proving for the trade is another line of cement making. Here, however, the manufacturer is able to use the same expertness that characterizes, for example, the mechanical goods trade. Pure gum, of course, is employed in some fine goods, but for this type of cementing all grades of rubber are employed. A certain amount of reclaimed rubber and its substitutes are often added, and waterproof fabrics produced out of the most unlikely ingredients that are flexible, durable, and free from the decidedly strong odors that many of the original parts contained.

THE ELASTIC FABRICS COMBINE.

THE following from the *Springfield Republican* so well states the status of the elastic fabrics combination that we quote it in its entirety:

It is considered certain that the proposed combination of elastic fabric industries, which has been in process of formation for nearly 10 months, will not be consummated. Lee, Higginson & Co. of Boston were to finance the trust, which was to include four mills in Easthampton. At a meeting of prominent manufacturers it was held that the time was not now opportune for the consolidation. Difficulty in floating the stocks and bonds was anticipated. The company was to be capitalized at an amount between \$8,000,000 and \$12,000,000. The idea of the promoters was to first organize the fabric concerns and later to secure control of the rubber thread mills, which supply material to the former concerns. Several of the first option offers were rejected by the several companies, and finally the matter was delayed until the time had gone by when the market was believed receptive to trusts stocks of that nature.

PROGRESS IN INSULATION FOR ELECTRICAL TRANSMISSION IN GERMANY.

By Oscar Schaefer, Duisburg a/Rhine.

EDITORIAL NOTE.

THE electric power transmission between the towns of Meran and Bozen, in the Tyrolean Alps, has a line 25 miles long, fed with currents of 10,000 volts. The current is supplied through two cables, one employing India-rubber and the other "Kabelit" insulation. The cables are laid for part of the distance underground, being connected to a network of overhead bare wires. These cables were supplied by the Kabelwerk Duisburg (Duisburg a/R.), then under the management of the writer of this paper. Mr. Schaefer acted for fourteen years as assistant to the manager of the cable department of Siemens Brothers & Co. (Woolwich). In 1893 he established at Duisburg the Rhenische-Westphalisches Kabelwerk, O. Schaefer, later selling the same to a company organized as the Kabelwerk Duisburg, of which he became manager. At the beginning of 1899 he resigned, on account of ill health, but is still consulting engineer to the board.

WHEN I commenced work in Germany, the manufacture of high class vulcanized India-rubber wires and of high tension cables had been little developed there, and engineers were inclined to distrust both. It was my first effort, therefore, to try to create confidence in such wires and cables generally, but more particularly in my own product. Almost the first firm that showed confidence in India-rubber insulated wires and cables, and ordered them in large quantities, were O. L. Kummer & Co. (Dresden), now trading as the Actiengesellschaft Elektrizitätswerke vorm. O. L. Kummer & Co. Some of these cables, supplied in 1895, have a special interest, as pieces of them, from fifty to a few hundred yards in length, were, at Niederloesswitz, near Dresden, laid underground and inserted in an extensive overhead network of uninsulated copper conductors, at railway and street crossings.

These cables contain two cores, ends composed of a strand of tinned copper wires, insulated with vulcanized India-rubber, taped and ozokerited. The two cores are stranded together, warmed and served with impregnated jute yarn, cased in lead and armored with steel hooking. The cables were at either end brought up to the top of the masts and the conductors of the two cores simply soldered to the overhead bare wires. There are no lightning protectors in the whole feeder network, except at the switchboard; the potential is between 2000 and 3000 volts. In spite of the locality being visited by exceptionally heavy thunder storms, the cables have never been damaged by lightning, and this fact has convinced me that the liability of underground cables, inserted in an overhead feeder system, of bare wires, to become damaged by lightning has been greatly overrated—at least as far as regards well insulated cables.

After Messrs. Kummer & Co. and another firm who ordered India-rubber cables for collieries, had broken the ice, I supplied large quantities of India-rubber insulated cables, high and low tension, for street work and mines, taking special care, however, to have the India-rubber *always* protected by a lead casing whenever I could prevail upon customers to incur this extra expense. As I refused to undertake any guarantee for underground and mine cables specified to be insulated with India-rubber, *without* lead protection, I succeeded nearly always in persuading engineers to adopt the lead casing.

Among the great number of cables which I have supplied for mines, there is one which perhaps has some special interest. About three years ago I was asked by the manager of a coal

mine in the Westphalian district if I would supply and guarantee a cable for three phase current with a working potential of 3000 volts and 3+70 sq. mm. section, to be hung in a very wet shaft. As the water in the shaft attacks metals, and low tension cables had frequently failed in the mine, the manager was very anxious as to the result. I supplied a cable to the following specification: Each core consists of a strand of tinned copper wires, insulated with vulcanized India-rubber, taped and ozokerited. Three cores are stranded together, warmed and served with ozokerite-impregnated jute yarn and cased in lead. The lead cased cable is covered with Chatterton's compound, taped with manila paper, covered again with Chatterton's compound and a double layer of kabelit, taped with prepared cotton tape, served with a layer of tarred jute yarn, armored with tarred manila yarns, and served again with two layers of tarred jute yarn; a coating of asphalt compound being applied between each two layers of yarn and over the finished cable. The lead (with a small percentage of tin) served of course to protect the India-rubber cores against gas and water. As iron is attacked by the water in the mine and I was afraid that, notwithstanding the careful insulation of the lead, strong galvanic action might take place between the lead and an iron armor, I decided not to use iron at all but to protect the cable by other means against mechanical injury. The cable being very heavy, however, it was necessary to give it some tensile strength, which was attained through the armoring with manila yarn. When letting the cable down in the shaft it was lashed every few yards to a cable hawser to take the strain off and as soon as the whole cable was hanging down it was, at every three yards, fastened to the wood work of the shaft by specially designed clamps. The cable has now been at work for two years and has given complete satisfaction.

In January, 1897, a St. Petersburg engineer complained to me about the great trouble he had with paper insulated cables. I advised him to use concentric India-rubber cables and supplied him with a quantity of such cables with lead and steel hooping, for 2000 volts, which have given such satisfaction that it was decided by one of the companies who supply current in St. Petersburg to use only such cables, and large quantities of this type were laid last year by an English firm.

At the beginning of 1897 the Elektrizitäts Actiengesellschaft vorm. W. Lahmeyer & Co. (Frankfort a/M.), to whom I had previously supplied large quantities of wires and cables, made a contract with the town of Wiesbaden for the erection of a central station on the three phase system with a working potential of 2500 volts, and decided to entrust my firm with the supply and laying of the necessary feeders and the feeding and distributing networks. I prepared two estimates, one for cables with fibrous insulation throughout and another for cables with fibrous insulation for the two main feeders (3+95 and 3+70 sq. mm.) from the station to the town, and the India-rubber insulation for the feeding and distributing network in the town itself. Taking in consideration that about fifty transformations were contemplated in the streets, in different parts of the town, and that for these and the house branches a great number of end protectors would be required in the case of cables with fibrous insulation, as well as some other savings which would be made if India-rubber cables were adopted, I found that a network of India-rubber cables, consisting altogether of about

forty miles for the first section then to be laid down, would not come very much dearer than a network of cables with fibrous insulation. I laid both estimates before Professor Salomon, the general manager of the company, and strongly recommended that he incur the extra expense and use India-rubber cables. In spite of the endeavors made by other cable manufacturers to discredit India-rubber cables for underground work, Professor Salomon adopted my views and ordered India-rubber cables, notwithstanding the fact that his firm would only be paid for cables with fibrous insulation and incurred a considerable loss of profit by their decision to supply the very best cables that could be bought.

The specification for both high and low tension cables is as follows: The cables contain three cores, each consisting of a strand of tinned copper wires, insulated with vulcanized India-rubber, taped and drawn through colored wax, to be able to distinguish the cores throughout the whole network. Three cores are stranded together, warmed and served with ozokerite-impregnated jute yarn, cased in lead and armored with steel hooping. The principal hotels and business houses are connected by branch cables to the high tension feeder network and have their own transformers, whereas small consumers are connected to the low tension distributor network; several hundred such branch connections were made during the laying of the cables. In April, 1898, current was sent in the cables, and not a single short circuit or other mishap has occurred in any of the cables or boxes from the time they were first put under current until to-day, which is a performance hitherto unknown in Germany.

The Wiesbaden network is of special interest, as it is—so far as I am aware—the first network which consists entirely of multiple India-rubber insulated cables with lead and iron armoring, laid direct in the ground without further protection; about thirteen miles of similar cables for 3000 volts were laid down by me in 1896 in Essen to electrical tramway sub stations.

We made also large quantities of cables for low tension work at Duisburg, for central stations and private installations, among others several hundred miles of cables for 500 to 600 volts continuous currents to be used as feeders for electrical tramways in Brussels, Liège, Elberfeld, Essen, Wiesbaden, Leipzig, Christiania, and elsewhere.

For four or five years I have been trying to induce German electrical engineers to use underground cables for tensions of 10,000 volts and above, instead of overhead bare wires, but was invariably met by the objection that a cable line would be too expensive and the insertion of short pieces of cables in an overhead circuit of bare wires would tend to breakdowns through lightning discharges; there was moreover a general distrust of cables for such voltages. It is of course quite true that the first outlay for cables is much higher than for overhead bare wires, but if maintenance, depreciation, and also disturbances to which overhead lines are exposed, are taken into consideration, cables will be actually cheaper in the end. I went very carefully into this matter with Mr. Hassold, the able manager of the Etschwerke, when it was proposed in January, 1899, to erect an additional overhead line of about twenty miles for conveying current from the Etschwerke to Bozen, and we arrived at the result that cables would come out cheaper. The Etschwerke thereupon decided, in concurrence with their consulting engineer, Mr. Oscar von Miller, not to erect the additional overhead line but to make shift with the existing one until the cable experiments, referred to below, were terminated, and if these proved successful then to lay a 10,000 volt cable instead. In a description of the Etschwerke, published by Mr. von Miller, in the *Elektrotechnische Zeitschrift*, (Berlin) of August 31, he

confirms this by saying that it is intended to lay next year a cable to increase the carrying capacity of the Bozen feeder.

As regards the objections to pieces of underground cables in an overhead circuit of bare wires, I have already mentioned, when speaking of the cables supplied to Messrs. Kummer & Co., that I am convinced that the danger of lightning discharges to well insulated cables has been greatly overrated and, in order to convince others and create confidence in my cables, I offered to several firms to supply them a length of 10,000 volt cable for insertion in an overhead circuit of bare wires; the cable to be buried underground and only to be paid for after it had satisfactorily worked during a period of twelve months. I succeeded at last in arousing Mr. von Miller's interest in the matter. Mr. von Miller has designed and executed, among others, a number of works where electricity is generated by water power and transmitted over considerable distances on overhead bare wires at high potentials. When erecting such wires, great opposition was frequently encountered and circuitous routes had in many cases to be adopted, to avoid passing through villages, etc. Mr. von Miller would gladly have laid cables through such villages, if he had been convinced that cables would work satisfactorily with a potential of 10,000 volts and could be efficiently protected against damage by lightning.

After explaining to Mr. von Miller the conditions under which cables were used at Niederloesswitz and the experience there gained, he put me in communication with Mr. August Hassold, who superintended the construction of the Etschwerke to Mr. von Miller's designs and is now the manager of these works. I saw Mr. Hassold in the spring of 1898 and arranged with him the conditions under which the experiments should be carried out. We agreed to lay two cables of entirely different construction, side by side, and to work them alternately, so as to see if one of them showed any advantage over the other; the length of the cables being about 300 yards. In September, 1898, I went again to Meran to lay and connect the cables myself. The first cable contains three cores, each composed of a stranded tinned copper conductor 35 sq. mm. in section, insulated with vulcanized India-rubber of a thickness of about 0.2 inch, taped and drawn through colored wax. The three cores are stranded together, warmed and served with ozokerite-impregnated jute yarn, cased in lead and armored with steel hooping. The tests of cores and cable are given in the first of the tables on the following page.

The second cable contains three cores, ends composed of a stranded untinned copper conductor 35 sq. mm. in section, insulated with kabelit, of a thickness of about 0.2 inches, taped, ozokerited, and cased in lead. The three lead cased cores are stranded together, warmed, and served with tarred jute yarn between layers of asphalt compound and armored with steel hooping. The tests of cores and cable are given in the second table.

The first cable represents a type which I have used largely in other places for high tension work, and I was quite confident that it would answer well. The second cable is insulated with a material which I first introduced in 1895 and then called kabelit. This material, which is nonhygroscopic, contains no sulphur or other ingredients which could attack the copper conductor, and offers a very high resistance to high voltage currents; it is moreover cheaper than India-rubber. I boldly decided to use it for the second 10,000 volt cable, notwithstanding that it had never before been used for high tension cables in actual work.

Another feature which distinguishes the second cable from the first is the lead casing over each separate core. It had occurred to me long before that the India-rubber and kabelit

cores in multiple cables would be better protected against the oxidizing influences of soil, gas, and air, especially also at their ends in cellars, transformer chambers, etc., if they were separately lead cased before stranding, and the cables thus made would not be inferior electrically, but better and safer than the ordinary type with lead over the stranded cores. Electrical engineers with whom I discussed this latter question hesitated to express an opinion. To settle the question, I adopted other construction for the second cable, and may here state that I have since supplied such cables in considerable quantities for

TABLE NO. 1.

DATE.	Number of length.	Section in Sq. mm.	Insulation resistance per kilometer at 15° C. in megohms after an electrification of—				Capacity per Km. in microfarads.	Copper resistance per Km. at 15° C.	Remarks.
			1 min.	2 min.	3 min.	4 min.			
July 1 '98	1	35	4672	5850	6680	7735	0.477	0.475	36 hours in water.
Tested for half an hour with 20,000 volts between conductor and earth and retested.									
July 1 '98	1	35	4672	5850	6680	7735	—	—	36 hours in water.
	2	35	3815	5850	6685	7630	0.434	0.494	
Tested for half an hour with 20,000 volts between conductor and earth and retested.									
July 1 '98	2	35	3815	5850	6685	7630	—	—	36 hours in water.
	3	35	4670	7752	9300	9982	0.427	0.497	
Tested for half an hour with 20,000 volts between conductor and earth and retested.									
July 14 '98	3	35	4670	7752	9300	9982	—	—	Three cores stranded together, lead cased, and armored.
	1	35	4380	7320	10800	—	0.492	0.495	
	2	35	4380	7320	10800	—	0.492	0.494	
	3	35	4380	7320	10800	—	0.492	0.497	
Tested for half an hour with 20,000 volts between conductors and retested.									
	1	35	4380	7320	10800	—	—	—	
	2	35	4380	7320	10800	—	—	—	
	3	35	4380	7320	10800	—	—	—	

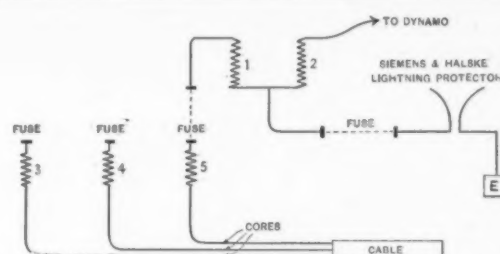
TABLE NO. 2.

DATE.	Number of length.	Section in Sq. mm.	Insulation resistance per kilometer at 15° C. after an electrification of—				Capacity per Km. in microfarads.	Copper resistance per Km. at 15° C.	Remarks.
			1 min.	2 min.	3 min.	4 min.			
July 2 '98	1	35	1292	1840	2450	2760	0.360	0.497	8 days in water.
Tested for half an hour with 20,000 volts between conductor and earth and retested.									
July 4 '98	1	35	1292	1840	2450	2760	—	—	8 days in water.
	2	35	1303	1843	2220	2460	0.390	0.496	
Tested for half an hour with 20,000 volts between conductor and earth and retested.									
July 4 '98	2	35	1303	1843	2220	2460	—	—	8 days in water.
	3	35	1180	1685	2022	2240	0.359	0.496	
Tested for half an hour with 20,000 volts between conductors and earth and retested.									
July 14 '98	3	35	1180	1685	2022	2240	—	—	Three cores stranded together and armored.
	1	35	1282	2120	3040	—	0.354	0.497	
	2	35	1390	2330	3520	—	0.354	0.496	
	3	35	1318	2330	3040	—	0.359	0.496	
Tested for half an hour with 20,000 volts between conductors and retested.									
	1	35	1282	2120	3040	—	—	—	
	2	35	1390	2330	3520	—	—	—	
	3	35	1318	2330	3040	—	—	—	

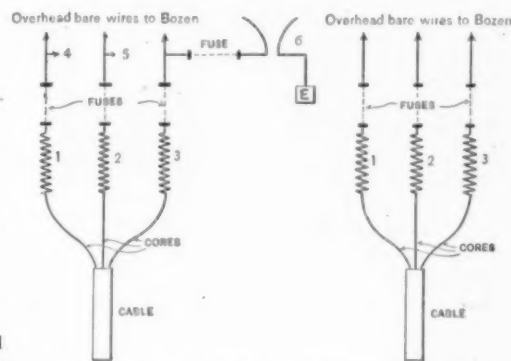
tensions up to 3000 volts. Mr. Hassold, who last spring laid several miles of my India-rubber cables with separate lead casings over each core in his Bozen network, wrote to me on August 17, 1899, that he was well satisfied with these cables.

Both 10,000 volt cables were laid side by side in the ground, without any further protection. One end of each cable was introduced in the switchboard room, opened out, and connected to the switchboard as per sketch No. 1.

The other ends of the cables were originally cemented in the



SKETCH I. 1, 2—Choking Coils of Bare Copper Wires; 3, 4, 5—Choking Coils formed of the Insulated Wires.



SKETCH II. Choking Coils of Bare Copper Wires; 4, 5, 6—Siemens & Halske Lightning Guard.

SKETCH III. 1, 2, 3—Choking Coils of Bare Copper Wires.

open air to the overhead bare conductors, leading to Bozen (about twenty miles), as per sketch No. 2, but last spring the connections were altered, as per sketch No. 3, the lightning protectors having been discarded. The fuses were left in circuit to enable the engineer in charge to switch out either, or in case of accident both, of the cables; working in the latter case throughout with bare conductors.

The outdoor connections are now practically the same as at Niederloesswitz, near Dresden, the cable conductors being directly connected to the overhead bare wires, without lightning guards; the only difference being the choking coils of bare copper wires, which were soldered by me to the cable conductors and could not be removed by the engineers of the company without disturbing the arrangements to provide against surface leakage in the cores in wet weather. The cables were put under current on September 11, 1898, and have been working since with a current of about 25 amperes at 11,000 volts. When I was last in Meran, at the end of June, the cables were still in good condition and I was informed that, both last year and this, heavy lightning discharges had passed through the cables without damaging them in any way. Mr. Hassold writes me, under the date of August 17:

"Our experience during the last twelve months has shown us that lightning is not very dangerous to cables. Both cables have worked throughout the whole of this year's storm season without lightning guards. Two discharges, which left considerable traces behind in the switchboard room, have passed this year through the India-rubber cable without damaging the same in any way."

The experiments having now been conducted during a period of more than twelve months, they may be taken to have proved:

I. That well constructed cables can be relied on at a working potential of 11,000 volts.

II. That pieces of well insulated high tension cables can be laid under ground and put in circuit with a line or network of overhead uninsulated conductors without great liability of the cables being damaged by lightning; lightning guards at the joints not being necessary. This is verified by the experience at Niederloesswitz.

III. That kabelit insulated cables are as reliable for high tension work as India-rubber insulated cables.

IV. That lead casing over each core in multiple cables for high tension work does not make the cables electrically inferior to cables with lead over the stranded cores; if it makes the cables—as I maintain—electrically better can only be proved by comparative results with cables which are otherwise of equal construction.

In conclusion I take this opportunity of thanking Mr. Oscar von Miller, in Munich, and Mr. August Hassold, in Meran, for kindly providing the opportunity of these interesting experiments being carried out.

THE HARD RUBBER COMB INDUSTRY.

COMBS were among the earliest products, on a large scale, of hard rubber, and their manufacture continues to be an important branch of the hard rubber industry, in spite of the numerous materials from which combs were made previously, and which are still used, and the new substances—notably celluloid—from which these indispensable adjuncts to the toilet are now made. When the late Conrad Poppenhusen bought from Nelson Goodyear various licenses to manufacture hard rubber goods under the latter's patent, \$20,000 of the total amount paid was for the right to use this material in combs, and the importance of this branch of the business is indicated by the fact that of the various firm names under which the Poppenhusen establishment at College Point, L. I., conducted their business, that which survived longest was The India Rubber Comb Co. Under this name was built up the largest hard rubber business that has ever existed under a single management, and that which formed the largest factor in the organization of the present American Hard Rubber Co. Another component company in this \$2,500,000 corporation is the Butler Hard Rubber Co., which first began business as the Sonneborn Comb and Jewelry Co. In Europe, likewise, combs have formed an important share of the production in hard rubber, as indicated by the names of two important concerns in Germany—the Harburg Rubber Comb Co., with factories at Hamburg and Harburg a/d Elbe, and the Hannoversche Gummi-Kamm Co., Aktiengesellschaft. The recent great development of the electrical industries has created a new demand for hard rubber more important, in point of value, than that for combs, but the production of combs still holds its own.

Points in favor of hard rubber combs are their durability, their comparative elasticity, the ease with which they can be kept clean, and their cheapness as compared with some other materials. There are hard rubber combs made in America which net only $1\frac{1}{2}$ cents each to the manufacturer, from which price there are advances to figures many times larger. There are limits, however, to the ornamentation of hard rubber combs, and they can be made only in plain black, for which reason other materials are preferred when expensive combs are demanded. For example, hard rubber combs cannot be mounted with silver, for the reason that this metal soon becomes black in contact with rubber in any form. Gold mounted combs would be rather too expensive for a large sale, while attempts

to introduce aluminum mounted combs have failed. Some combs have been made, however, trimmed with brass, outside of which German silver has been rolled, making a rather showy comb which can be retailed at a low price.

There are "toilet combs," coarse toothed for one-half the length, the remaining length being shaped conveniently for a handle; "dressing combs," one-half the length being coarse toothed and the other fine toothed; "barber combs," similarly divided, or altogether coarse toothed; "fine combs," toothed on each side; "pocket combs," either straight, and fine or coarse toothed or both, or folding, with one end fine toothed and the other coarse. There are also no end of combs for ladies and children, to be worn in the hair—"twist," "round," etc.—giving room for a greater variety of form than those which are used only in the toilet.

The principal method of teething combs is by sawing out spaces between the teeth, in hard rubber blanks made of the proper size and vulcanized. The operation is an interesting one, a number of small saws being mounted on one shaft or journal, while the rubber comb blanks to be toothed are placed in clamps or vices, one for each saw. As the saw cuts into the blank to the proper depth the clamp device automatically withdraws, advances slightly along the table, and presents the blank to be sawed again, this being repeated until the comb is completed. The attendant, who can look after eighteen saws at once, then removes the comb and inserts a new blank into the clamp. The resulting sawdust is preserved carefully for further use as hard rubber. This sawing operation is the same as that employed in the manufacture of combs from other materials.

"Grailed" combs are those in which the teeth are formed by sawing, the square corners of the teeth being rounded off by tooling. "Cut" combs are those for which one blank is made for two combs; this is cut apart by a tool in such a manner that the material removed between the teeth in making one comb serves as the teeth of the other comb, so that no material is wasted. Still another class is known as "pressed" combs, though they might be described as "molded." In their manufacture the soft material, before vulcanization, is pressed into metal dies, with the result that it comes out in the shape of finished combs. A drawback to this method which has been mentioned is that so many combs come out of the dies in an imperfect condition that the price which must be placed upon the perfect ones, in order to afford any profit, is an obstacle to the sale of the goods.

A PAPER was read by Dr. G. Zapf before the Electrotechnical Society of Cologne, on the manufacture of insulated cables for low and high tension circuits, giving a very full description and many specific hints. Impregnated fiber is recommended as insulating material for circuits of less than 600 volts, and paper for higher voltages up to 6000 volts. For the lighting installation of the Kaiser Wilhelm canal, on which 7500 volts are used, a combination of rubber and Gutta-percha is used, the results being very satisfactory. For higher voltages than 5000, rubber insulation is used in general. When testing cables, much higher voltages should be applied than those at which they have to be used; the 2000-volt cables of Cologne were tested at 5000 volts; those for the Kaiser Wilhelm canal, for 7500 volts, were tested at 30,000 volts; several other cables were tested up to 50,000 volts. As a general rule for low and high tension cables, 500 and 1000 megohm per kilometer are required respectively, but this insulation is often exceeded. The paper appears in the *Elektrotechnische Zeitschrift* (Berlin), for August 10.

NEW GOODS AND SPECIALTIES IN RUBBER.

THE STANDARD FOUNTAIN PEN.

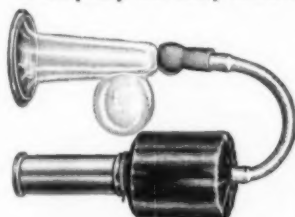
THE special feature of this pen which is worthy of note, that is, aside from the fine workmanship embodied in its construction, is an absolutely non-leakable ink joint which is placed in the center of the barrel, away from the grasp of the fingers, and is so nicely fitted and strongly made, that the barrel is practically solid from end to end. This result was achieved specifically by the use of a double



union ink joint, which was patented by the makers, the use of which prevents inky fingers and soiled clothing. The Standard pens are made in all sizes with either black or mottled holders, and smooth or threaded under the finger grasp. The rubber of which they are made is the highest possible quality, and the finish is perfect. Manufactured by The Sterling Fountain Pen Co., of which the Davidson Rubber Co., Boston, are proprietors.

THE HOOVER BREAST PUMP.

THIS pump has many features of excellence that should make it a prompt seller everywhere.



It is a simple, practical, comparatively inexpensive apparatus and shows to good advantage. It produces a continuous flow of milk and in use will not irritate. Manufactured by the Standard Mfg. Co., Waterloo, Iowa. For sale to the trade by Morrison, Plummer & Co., Chicago, Ills.

FELTED RIMS FOR PNEUMATIC TIRES.

A NEW invention by A. W. Kent, of Boston, for which letters patent have been applied, relates to the use of rubber, felt, or other soft material attached to the edge of wheel rims, to be used for pneumatic tires of all kinds, preventing the wearing or cutting of the outer edge of the rubber tube, on either metal or wood. It is designed for use on bicycles and wagons, automobiles, and other heavy vehicles. Apart from the protecting



strips as shown in the cut, the rim by its peculiar construction is greatly strengthened and improved in appearance, and the possibility of nipples being drawn through the rim, as frequently occurs, is entirely overcome, owing to the cavity for the nipple heads being recessed into the rim instead of countersunk, as in the methods used hitherto. [Colonial Automobile Co.—George N. March, manager, No. 32 Hawley street, Boston.]

ARTIFICIAL SPONGES.

A GREAT many interesting experiments have been tried in the attempt to produce artificial sponges, particularly of rubber. A new line of experiment which is now apparently near successful completion is that carried on by Dr. Gustav Pum, of Graz, Germany, and is based upon the action of zinc chloride solution upon pure cellulose. The resultant product swells enormously with water, but turns to a horn-like product on drying. In order to retain for the product, the property of also absorbing water after drying, alkali-haloids are employed in treating the cellulose with the zinc chloride.

The mass after manipulation and molding is said to take the place of sponge in all its uses. This result is of particular interest to the rubber trade at the present time, when one remembers that alkaline solutions of cellulose have already been combined with rubber successfully and experts have claimed that the real rubber substitute would come from this field.

MAGIC POCKET STAMP.

THIS is the simplest rubber stamp yet invented, and is designed for use at the desk or to be carried in the pocket. For this latter use it is especially adapted, as it has no sharp corners, is smooth and flat, and has no projections or knobs or handles to break off or wear holes in the pocket. The hinged handles are an exceedingly ingenious feature of this stamp. When not in use they lie flat, a touch in the center, however, brings them up, and as they are hinged the stamping is always evenly done, as they give just enough to give a cushion effect. This stamp is dust proof when closed and so arranged that the rubber type does not touch the pad when closed, and thus get squeezed out of shape and lose its sharpness. Manufactured by



C. A. Klinkner & Co., San Francisco, Cal.

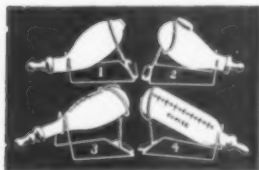
THE STIMPSON BUCKLE.

ONE of the most ingenious buckles of the many that the rubber trade has seen is that shown in the accompanying illustration. The tongue, the groove and the locking device are so plainly shown, that no special description is necessary. This type of buckle is useful for arctics, leggings, or clothing, and is manufactured by Edward B. Stimpson & Son, 31 School street, New York.



THE PERFECTION NURSING BOTTLE HOLDER.

WHETHER they are right or wrong, physicians have taken a decided stand against the use of rubber tubes in connection with feeding bottles. It will be remembered that in Buffalo a law was passed forbidding the use of rubber tubing on feeding



bottles. The Perfection Holder, therefore, should be welcomed, as it makes it perfectly easy to feed the little one without the use of tubing. The holder is made of white spring wire and designed in four styles to fit the leading bottles now on the mar-

ket. When in use it pins firmly to the pillow and holds the bottle tightly in place. Manufactured by The Perfection Bottle Holder Co., Oldtown, Me.

SOME MILLER SEAMLESS SPECIALTIES.

OF the many very interesting pure gum specialties made by The Miller Rubber Mfg. Co., Akron, Ohio, those that are shown by the accompanying illustrations are perhaps the most

THE MILLER RUBBER MFG. CO., AKRON, O.



valuable. The simplest of them all is the finger cot, which is shown in the smaller illustration as it is rolled up before use. In the second illustration it is shown on the finger, over which it rolls very easily. This is put to so many uses, chemical and professional, that the drug houses throughout the world all carry them in stock and the sale is very large. In the same



line of manufacture, comes the rubber glove for surgeons, chemists, undertakers and others, and which is an absolute protection in all operative work against exposure to infection both to patient and operator. This is made of the finest material, is

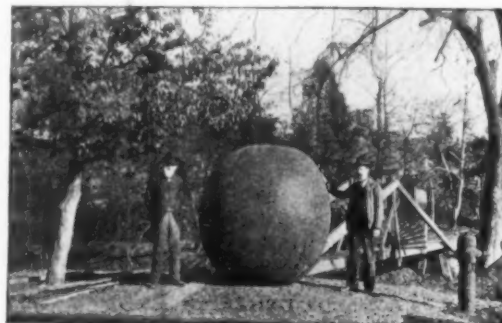


as thin as the human skin, is strong, durable and waterproof. As this is non-absorbing and impervious, it may be made absolutely sterile. The most delicate operations may be successfully carried through with these gloves upon the hands, as the sense of touch is in no way blunted. Another interesting specialty is the rubber face mask, which is also made of high grade rubber, and is a beautiful piece of work. The rubber does not come in contact with the skin, but being close to it and impervious, it acts practically as a local hot air bath, which perhaps is an advantage to some complexions. At all events, the work from the standpoint of a rubber man is exceedingly well done and the masks evidently

have a ready sale for they are to be seen in drug and rubber stores the world over.

A GIGANTIC PUSHBALL.

THE illustration shows what is without doubt the largest pushball ever made. It is six feet in diameter and made of heavy stock, but is not intended for the ordinary game. On the contrary it is to be used in a game that is likely to supersede the tug of war in such places as regimental armories. In use two



teams are chosen, the game being to push the ball through or over the opposing team up to the goal. It is said that in this game the marvellous amount of finesse may be used as well as plenty of strength. It is full of surprises, and produces an amount of fun and excitement such as the tug of war never succeeded in doing. These balls are manufactured by the Hodgman Rubber Co., New York.

SLIPPING BELTS AND CLING-SURFACE.

THE question of how to obtain the greatest amount of power from the belts of the multitude of belt driven plants in the land is one of the most important mechanical problems we have before us to-day. Almost all manufacturing establishments have been running light for some years and the belts have lain idle and deteriorated. Now, with the great increase in business and manufacturing, the belts are not equal to the tremendous strain put upon them, and everywhere they are as tight as it is possible to pull them, because the least relaxation of tension causes slipping. Cling-Surface is a filler and preservative for belts. It is to be applied to the inner surface of a belt, whence it will penetrate and fill it, caus-

ing every fiber composing the leather or cotton to lie and work in a perfect bearing, and it leaves the surface of the belt in a condition which allows it to lie and cling very close to the pulley. This surface is clinging but not sticky and is so perfect that there is absolutely no slipping of the belt, even under heavy strain. As the belt does not stick it can be run slack, relieving strain on it and the bearings, and by giving more belt surface for friction on the pulley face more power will be transmitted by the slack belt than by a tight one. Prof. R. C. Carpenter, of Cornell University, has made a very careful series of tests with Cling-Surface, and says "the only limit to the transmitting capacity of a belt full of Cling-Surface is the strength of the belt." When filled with Cling-Surface the belt substance is as soft as calf skin but firm, and is absolutely waterproof. This describes the condition of leather cotton belts or rope drives. On rubber belts, of course, the Cling-Surface will not penetrate, but applied in smaller quantities it gives the same clinging surface and stops all slipping. [The Cling-Surface Manufacturing Co., Nos. 125-131 Virginia street, Buffalo, N. Y.]

THE MILLER SMOKE PROTECTOR.

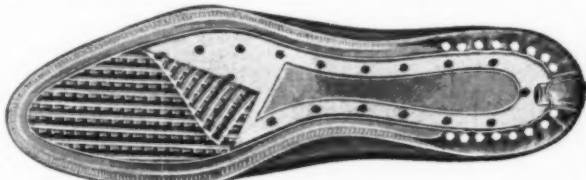
A GREAT variety of smoke masks have been made, but as far as we are able to learn, the Miller rubber protector is altogether the best thing on the market. It protects not only the mouth and nostrils, enabling one to breathe pure air in the densest smoke, and also protects the eyes, allowing one to see at the front and at the sides. It stays automatically in position, thus leaving the hands free for action, nor can it be broken while in



use, and will protect the entire face against heat as well as against smoke. With the protector properly adjusted, a fireman has been known to work in dense smoke for one hour and twenty minutes without discomfort. With the use of the Miller protector many lives have been saved, and a great deal of property as well. Manufactured by The Miller Smoke Protector Co., and for sale by The Syracuse Rubber Co., Syracuse, N. Y.

VENTILATION IN LEATHER SHOES.

THE Beam Shoe is perhaps the best type of air cushion shoe that has ever been brought out. Briefly described, the inside of the shoe is perforated so that when the foot presses down upon it, the hot air surrounding the foot is forced out through these perforations. It then passes between the inner and out-



side sole and is expelled through a tube that runs up between the counter leathers of the heel. This tube terminates in a small eyelet, and when the foot is raised and the pressure removed, fresh air enters through the eyelet to replace that which has just been expelled. In order to have the air pumped thus into the shoe, it is necessary to have an elastic cushion under-

neath the perforated inner sole. This is accomplished by what is called the patent ball bearing cushion. This is transversely corrugated and perforated, thus giving what might be called the ball-bearing effect. This cushion is impervious to heat or cold or moisture and will last as long as the shoe. Manufactured by G. A. Kantrowitz & Co., 253 Market street, Chicago, Ill.

RUBBER FOR FACIAL MASSAGE.

THE theory of the rubber roller in place of the fingers of the skilled operator for facial massage is a very attractive one, as it does away with rubbing, pinching and extra friction. It is also said that it makes the skin elastic, the tissues underneath filling out, and the shallow shrunken face becomes plump and rosy. This may be so. No doubt it is so, if it is accompanied by exercise, pure air, wholesome food and rest. Anyone who will use these ingredients in connection with the roller will notice a marked improvement almost immediately. The handle of the roller is made of ivory and ebony, the rings on the rollers being made of soft rubber. Manufactured by the Health Culture Co., 503 Fifth avenue, New York city.



THE RECORD STANDARD PEDAL.

THE neat rubber mat that is shown in the Record Standard is the prettiest idea that has yet appeared in pedal rubbers. The Number 9 B is designed with the idea of having a rubber and



rat-trap pedal at one and the same time, the little rubber mat being just heavy enough to balance the rat-trap. If the rider desires to change from one to the other, a touch is enough to do it. Manufactured by the Record Pedal Mfg. Co., 211 Columbus avenue, Boston, Mass.

It has been mentioned in THE INDIA RUBBER WORLD already that much complaint has been heard in Russia of mud splattering by rubber tires on vehicles. The St. Petersburg *Herald* reports that experiments with mud guards have been continued until the manufacturers of such devices are prepared to guarantee absolute safety.

CHARLES RUBBERNECK is an iceman of the borough of Brooklyn.—*New York Sun*.

ESTIMATE FOR A RUBBER PLANTATION IN NICARAGUA.

By William S. Armstrong.

THE following estimate of the cost of forming and keeping up a plantation for the cultivation of India-rubber, bananas, and cacao, has been prepared for THE INDIA RUBBER WORLD by Mr. William S. Armstrong, of Albany La., who is interested in such a plantation at Bluefields, Nicaragua. The first question which confronts the intending rubber planter is what crop to plant on the same land, in order to pay the expenses of cultivation until the rubber trees reach a productive age. Mr. Armstrong has decided in favor of the banana plant, the life of which is about eight years, its yield ceasing about the time that of the rubber tree begins. He considers it well, also, to grow cacao—which is only a shrub—between the rows of rubber trees, as a permanent source of income. An important advantage from such a combination of crops is that the banana affords the shade required by the rubber and cacao plants to a certain point, after which the rubber trees become large enough to shade the cacao permanently.

This estimate covers a plantation of 80 acres, containing 9600 rubber trees, 12,000 cacao trees, and 12,000 hills of bananas. Labor is estimated at \$6 to \$8, gold, per month. It is estimated that the rubber trees will yield 2 pounds of rubber each, for thirty years and the cacao 8 pounds annually for the same length of time.

First Year.

Cutting down forest and planting 12,000 hills bananas @ \$8 per acre.....	\$640	
Cleaning and cutting down weeds once @ \$2.75 per acre.....	220	
Gathering and planting 10,000 Rubber seed.....	20	
Gathering and planting 13,000 Cacao seed.....	50	
Care of Rubber and Cacao nursery.....	37	
Replacing banana plants which may die.....	50	
Manager's salary.....	600	
Four pack horses and equipment.....	200	
Plantation house.....	500	
Laborer's house.....	100	
Commissary and storehouse.....	200	
Furniture.....	100	
Safe.....	25	
Stationery.....	15	
Farm implements.....	200	\$2057

Second Year.

Two cleanings of plantation @ \$2.75 per acre.....	\$440	
Transplanting 9600 Rubber trees.....	120	
Transplanting 12,000 Cacao trees.....	160	
Gathering and planting seed for transplanting.....	10	
Care of nursery.....	12	
Marketing 15,000 bunches bananas @ 2½ cents.....	375	
Manager's salary.....	600	
Stationery.....	15	
Boats.....	100	\$1832

Third Year.

Two cleanings of plantation @ \$2.75 per acre.....	\$440	
Replanting Rubber and Cacao.....	80	
Hoeing and care of plants.....	200	
Planting and care of nursery.....	10	
Marketing 20,000 bunches bananas.....	500	
Manager's salary.....	600	
Stationery.....	15	\$1845

Fourth Year.

Two cleanings of plantation.....	\$440	
Replanting Rubber and Cacao.....	60	
Hoeing and pruning.....	300	
Planting nursery.....	5	
Marketing 20,000 bunches bananas.....	500	
Manager's salary.....	600	
Stationery.....	15	\$1920

Fifth Year.

Two cleanings of plantation.....	\$440	
Replanting Rubber and Cacao.....	50	
Pruning and care of plants.....	200	
Marketing 10,000 pounds Cacao @ 4 cents per pound.....	400	
Marketing 20,000 bunches bananas @ 2½ cents.....	500	
Manager's salary.....	600	
Stationery.....	15	
Drying house and appliances.....	200	\$2405

Sixth Year.

Two cleanings of plantation.....	\$440	
Pruning and care of trees.....	200	
Marketing 20,000 bunches bananas.....	500	
Marketing 18,000 pounds Cacao @ 4 cents.....	720	
Manager's salary.....	600	
Stationery.....	15	
Boats.....	100	\$2575

Seventh Year.

Two cleanings of plantation.....	\$440	
Pruning and care of trees.....	200	
Manager's salary.....	600	
Stationery.....	15	
Marketing 30,000 pounds Cacao @ 4 cents.....	1200	
Marketing 12,000 bunches bananas.....	350	\$2805

Eighth Year.

Two cleanings of plantation.....	\$440	
Pruning trees.....	200	
Manager's salary.....	600	
Stationery.....	15	
Marketing 18,000 pounds Cacao @ 4 cents.....	1920	
Marketing 6000 bunches bananas.....	250	\$3425

Ninth Year.

Cleaning and care of plants.....	\$500	
Manager's salary.....	600	
Stationery.....	15	
Rubber calabashes.....	100	
Marketing 60,000 pounds Cacao @ 4 cents.....	2400	
Marketing 15,000 pounds Rubber @ 5 cents.....	750	\$4365

Tenth Year.

Cleaning and care of plants.....	\$500	
Manager's salary.....	600	
Stationery.....	15	
Marketing 19,200 pounds Rubber @ 5 cents.....	960	
Marketing 60,000 pounds Cacao @ 4 cents.....	2400	4475

Total, ten years.....\$28,604

PROCEEDS.

Second year—15,000 bunches Bananas @ 16 cents.....	\$ 2,400
Third year—20,000 bunches Bananas @ 16 cents.....	3,200
Fourth year—20,000 bunches Bananas @ 16 cents.....	3,200
Fifth year—20,000 bunches Bananas @ 16 cents.....	3,200
10,000 pounds Cacao @ 18 cents.....	1,800
Sixth year—20,000 bunches Bananas @ 16 cents.....	3,200
18,000 pounds Cacao @ 18 cents.....	3,240
Seventh year—12,000 bunches Bananas @ 16 cents.....	1,920
30,000 pounds Cacao @ 18 cents.....	5,400
Eighth year—6,000 bunches Bananas @ 16 cents.....	960
48,000 pounds Cacao @ 18 cents.....	8,640
Ninth year—15,000 pounds Rubber @ 60 cents.....	9,000
60,000 pounds Cacao @ 18 cents.....	10,800
Tenth year—19,200 pounds Rubber @ 60 cents.....	11,520
60,000 pounds Cacao @ 18 cents.....	10,800

Total, for ten years.....\$70,280
Expense of plantation.....28,604

Surplus proceeds.....\$50,676

Mr. Armstrong informs THE INDIA RUBBER WORLD that the above estimates are based upon his experience with a plantation of 35 acres, laid out as he has indicated. His bananas

had been growing, on February 10, 1899, eight years; the cacao, planted three years and ten months, was just beginning to bear; and the rubber had been planted (seedlings from the nursery) one month less. Owing to the fertility of his soil, he was expecting the yield of rubber to begin within six years of planting the seeds, though eight years is taken as the productive age in his estimates. He had previously made experiments with rubber trees from the planting of the seeds to the first tapping.

RECENT RUBBER PATENTS.

THE UNITED STATES RECORD.

ISSUED OCTOBER 3, 1899.

NO. 634,069. Vehicle Tire. Joseph D. Prescott, Boston, Mass., assignor of two-thirds to Albert W. Griffith, same place, and Chas. N. Bacon, Winchester, Mass.

634,108. Syringe. Andrew L. Henry, Ladoga, Ind.

634,281. Diaper. Laura J. Wolf, Columbus, Ohio.

634,371. Hand Stamp. Louis K. Scottford, Chicago, Ills., assignor to the Independent Mfg. Co., same place.

634,410. Rubber Cushioned Horseshoe. Charlotte E. Galley, Buffalo, N. Y.

624,435. Cushion Heel. Wilhelm A. Zickerman, Hyde Park, Mass., assignor by mesne assignments, of one-half to Olando B. Emery.

ISSUED OCTOBER 10, 1899.

634,680. Rubber Heel. Charles M. Berry, San Francisco, Calif., assignor of eleven-twelfths to Henry Summers, same place, and Mary Adams and Benjamin P. Maddox, Chicago, Ills.

634,725. Tubular Tire for Wheels. Christian Eickmann and Henry H. Fay, Indianapolis, Ind.

634,743. Heel. Charles Blackadar, Lynn., Mass., assignor of one half to George H. Simonds, same place.

ISSUED OCTOBER 26, 1899.

634,893. Elastic or Resilient Wheel for Vehicles. Thos. Lee, Philadelphia, Pa.

634,920. Pneumatic Tire. Benjamin F. Taylor, Bridgeport, Conn., assignor to the Taylor Tire and Development Co., same place.

634,998. Heel for Shoes. Byron Rumsey, Davenport, Iowa.

635,033. Adjustable Last for Boots or Shoes. Gilbert C. Bemis, Laconia, N. H.

635,335. Rubber Tired Wheel. Richard Mulholland, Dunkirk, N. Y. Issued October 24.

ISSUED OCTOBER 24, 1899.

635,416. Pneumatic Self Playing Instrument. Charles S. Batdorf, New York, N. Y., assignor to James W. Eaton, trustee, West Islip, N. Y.

635,434. Terminal for Pneumatic-Despatch Tube Systems. Edmond A. Fordyce, Chicago, Ills.

DESIGN PATENTS.

31,642. Hoof Pad. William J. Kent, New York, N. Y., assignor to Roscoe R. Bell and Elizabeth Kent, same place. Filed Aug. 18, 1899. Term of patent 14 years. Issued Oct. 10, 1899.

31,677. Nursing Nipple. Richard E. Pickball, Somerville, Mass., assignor to Rhodes Lockwood, Arlington, Mass. Filed Sept. 19, 1899. Issued Oct. 17, 1899. Term of patent 14 years.

THE ENGLISH PATENT RECORD.

APPLICATIONS FOR PATENTS.

17,438. Frederick Howard Smith, 79, Wellington park, Belfast. Elastic or suspended railway wheel for engines, carriages and wagons. August 29.

17,461. Harry Claud Anderson and Harris Markus, 70, Deansgate, Manchester. Improvements in the joints or seams of waterproof fabrics. August 29.

17,518. Edwin Miller Richford, 53, Chancery lane, London. Improvements in time dating and numbering stamps. August 29.

17,537. John Adair, 5, Manor Park, Redland, Bristol. Improvement in pneumatic tires for wheels and connections therewith. August 30.

17,558. William Arthur Morris, 200, Cambridge road, Kilburn, London. Purified gum in scales or flakes. August 30.

17,608. Wilhelm Seidel, 15, Water street, Liverpool. Improvements in the manufacture of cement. August 31.

17,612. Carl Otto Weber and Isidor Frankenburg, Greengate Laboratory, Salford. Improvements in the recovery of waste rubber. August 31.

17,578. Thomas Card Beakbane, 6, Lord street, Liverpool. Improvements in or relating to the rims and pneumatic tires of cycles and other vehicles. August 31.

17,652. Willis John Bickford, 18, Buckingham street, Strand, London. Improvements in the construction of collapsible tubes. August 31.

17,653. Arthur Chas. Moore and George Brandon, Birkbeck Bank chambers, Southampton buildings, Chancery lane, London. Improvements in elastic wheel tires. August 31.

17,655. Oliver Imray, Birkbeck Bank chambers, Southampton buildings, Chancery lane, London. New manufacture of compound for mixing with caoutchouc. [William V. McManus, U. S.]

17,658. Robert William Sampson, 6, Bream's buildings, Chancery lane, London. Improvements in devices for closing punctures in pneumatic tires. August 31.

17,746. Edward Everard Preston, 34, Belvoir street, Leicester. Improvements in the manufacture of rubber fabrics and webs. Sept. 2.

17,877. George Bestwick, 4, St. Ann's square, Manchester. An improved composition for or from which may be manufactured tubes for various purposes, tires and other articles requiring more or less flexibility or as a non-conductor of electricity. Sept. 5.

17,917. Henry William Colquhoun Mitchell, 21, Willoughby road, Hornsey, London. An improvement in tires. Sept. 5.

17,930. Elias Gunnell, 46, Lincoln's Inn Fields, London. Improvements in pneumatic hammers. Sept. 5.

17,992. Harry Ainsworth Smith and John Paterson Ainsworth Smith, 4, St. Ann's square, Manchester. Improved mechanism for facilitating the manufacture of pneumatic tires or covers therefor. Sept. 6.

18,002. Edward Tufft, 104, Colmore row, Birmingham. Improvements in and relating to detachable pneumatic tires for cycles, motor cars and other road vehicles. Sept. 6.

18,025. Frederick Rutherford Harris, Birkbeck Bank chambers, Southampton buildings, Chancery lane, London. An improvement in pneumatic tires. [Robert William Harris, Cape Colony.] Sept. 6.

18,029. George Whittaker Holt, 18, Southampton buildings, Chancery lane, London. Improvements relating to pneumatic tires. Sept. 6.

18,054. John Ostberg, 40, Chancery lane, London. An improved automatic rubber repairing compound for application to the inner tubes of pneumatic rubber tires generally, and like purposes. Sept. 6.

18,343. William James Henry Carr-Boyd and James Patrick Thomson, Birkbeck Bank Chambers, Southampton buildings, Chancery lane, London. Improvements in horseshoes. Sept. 11.

18,412. Adelbert Henry Alden, 45, Southampton buildings, Chancery lane, London. Improvements in India-rubber water-bags, bottles and the like. Sept. 12.

18,483. David Sanderson, 10, Oliver street, Portland road, Notting-ham. Pneumatic tire for bicycles and other like vehicle wheels. Sept. 13.

18,505. Eugen von Swertschkoff, 19, Holborn viaduct, London. Improvements in tires. Sept. 13.

18,506. Julius Heinrich Fritz Carstens, 115, Cannon street, London. Improvements in rims and pneumatic tires of wheels. Sept. 13.

18,546. William Thomas Cantrill, 128, Colmore row, Birmingham. Improvements in or connected with pneumatic tires for velocipedes and road vehicles. Sept. 14.

18,548. Florence Emily Gore Langton, Chalet Monplaisir, St. Moritz, Engadine, Switzerland. The Duplex Tire. Sept. 14.

18,549. Edward Forbes Pickett, 78, Fleet street, London. Improvements in valves for pneumatic tires. Sept. 14.

- 18,605. George Hookham, 18, Southampton buildings, Chancery lane, London. Improvements in pneumatic tires. Sept. 15.
- 18,626. Frank Elmer Hall, 77, Chancery lane, London. Improvements in and relating to elastic tires for vehicles. Sept. 15.
- 18,610. John Horswell, Jr., 10, St. George's crescent, Liverpool. An improved air-valve for pneumatic tires and like uses. Sept. 15.
- 18,672. Alfred Junod, 45, Southampton buildings, Chancery lane, London. Improvements in and relating to pneumatic tires. Sept. 15.
- 18,732. Henry Greudon Tippet and Thomas Webb, 6, Lord street, Liverpool. Improvements in pneumatic tires for the wheels of velocipedes and other vehicles. Sept. 16.
- 18,847. John Adair, Broomhill, West Malvern. Improvements in the construction of pneumatic tires and means for securing same to rims of wheels and arrangements connected therewith. Sept. 19.
- 18,887. Thomas Edward Downey, 16, Uamvar street, Poplar, London. An improved pneumatic tire. Sept. 19.
- 18,925. William Howard, 9, Warwick court, Gray's Inn, London. Improvements relating to pneumatic and other like valves. Sept. 20.
- 18,963. Howard Malcolm Du Bois, 45, Southampton buildings, Chancery lane, London. Improvements in and relating to tires for the wheels of vehicles. (Date applied for under patents, etc. Act 1883, Sec. 103, 11th May, 1899, being date of application in United States.) Sept. 20.
- 18,965. Amos Wilkinson and Samuel Edgar Hipwell, 23, Southampton buildings, Chancery lane, London. A new or improved preparation for repairing or stopping small punctures in pneumatic tires. Sept. 20.
- 19,043. Percy Frederick Cambridge Meyers, 166, Fleet street, London. An improvement connected with pneumatic tubes for cycles. Sept. 21.
- 19,076. Edward Henry Taylor and Michael Dunnf, 1, Broad street buildings, Liverpool street, London. Improvements in and relating to tires for wheels of vehicles and cycles. Sept. 22.

PATENTS GRANTED.—APPLICATIONS OF 1899.

- 10,694. Puncture fluid. Betts, G. J., 44, Beaconsfield parade, and Bower, F. T., 13, Grey street, both in St. Kilda, Victoria.
- 10,696. Rubber soled shoes. Lambright, C. R. L., 53, Altonaer Strasse, Hamburg, Germany.
- 10,757. Waterproof fabrics. Miller, J., and Miller, J., both of 10, Cunliffe villas, Manningham, Bradford, Yorkshire.
- 10,797. Vehicle tires. Sterne, T., 49, Rue de la Victorie, Paris.
- 10,802. Vulcanized belt gearing. Beck, F., 68, Nurnbergerstrasse, Berlin.
- 10,822. Waterproof garments. Green, A. E., 142, Bute street, Cardiff.
- 10,909. Pneumatic tire. Crocker, S. H., 31, Furnivall street, Holborn.
- 11,246. Vehicle tire. Lake, H. H., 45, Southampton buildings, Middlesex. [Hall, F. E., 123 Pearl street, Boston, U. S. A.]
- 11,264. Waterproof compositions. Newman, G. F., Peel Forest, Rangitata, Canterbury, New Zealand.
- 11,299. Pneumatic tire. Tipler, F. C., 48, Brooklyn street, and Gladden, T. A., 82, Gresty road, both in Crewe.
- 11,350. Golf club with Gutta-percha center. Ayrtton, W., The Cliff, Beccles, Suffolk.
- 11,470. Pneumatic tire. Willoughby, F. S., 12, Mosley street, Manchester.
- 11,603. Vehicle tire. Cook, H., 129, Church street, Wolverton, Buckinghamshire.
- 11,779. Rubber overshoe. Campbell, L. E., 120 South Summit street, Arkansas, Kansas, U. S. A.
- 11,932. Pneumatic tire. Lawson, H. J., 40, Holborn viaduct, Middlesex.
- 11,993. Pneumatic tire. Legrand, J. P., 8, Rue du Sentier, Paris.
- 12,124. Pneumatic tire. Martie, P. A., Granville street, Birmingham.
- 12,221. Pneumatic tires. Sloper, T., 14, The Brittox, Devizes, Wiltshire.
- 12,230. Pneumatic tire. Swain, W., and Swain, L. H., both of 177, Belmont road, Astley Bridge, Bolton, Lancashire.
- 12,327. India-rubber or Gutta percha compositions. Repin, C., 23, Boulevard Montparnasse, Paris.

- 12,467. Ball tire. Todd, J., 32, Rupert street, and Felce, B., 96, Whitehead road, Aston, both in Birmingham.
- 12,611. Vehicle tire. Lake, H. H., 45, Southampton buildings, Middlesex. [Bradlee, D. H.; 155 High street, Boston, and Hall, J. M.; Malden, both in Massachusetts, U. S. A.]
- 12,615. Pneumatic tire. Boursin, A., 34, Nelson street, Tralee, Co. Kerry.
- 12,747. Ball tire. Fontaine, H. A., 10 Mary street, Auburn, and Kellet, T. S., 87 Fourth street, Troy, both in New York, U. S. A.

PATENTS RELATING TO RUBBER.

CAN you inform me how many patents relating to India-rubber have been granted in the United States? Also, what would be the best method of gaining possession of the subject matter of these patents?

L. D. C.

Providence, R. I., October 9, 1898.

IT is impossible to say how many patents have been granted for inventions involving the use of India rubber. One of the 226 classes into which the subject-matter of patents is divided is entitled "Caoutchouc and Minor Plastics," and under this head there had been granted, to January 1, 1897, no less than 2164 patents. Of these 726 are listed as belonging specifically to "Caoutchouc" and the rest to "minor plastics," including Gutta-percha. But these are for the most part process patents. To find all the applications of India-rubber one would have to explore nearly every class of invention. Here is a partial list of classes and subclasses involving some use of rubber, and the number of patents granted in each to January 1, 1897—the date of the last enumeration made by the government:

CLASS 12. BOOTS AND SHOES.	
Subclass 14—Rubber boots and shoes.....	310
CLASS 16. BUILDERS' HARDWARE.	
Subclass 95—Springs—India rubber.....	18
CLASS 21. CARRIAGES AND WAGONS.	
Subclass 111—Tires, pneumatic.....	406
126—Tires, pneumatic, armor.....	56
CLASS 32. DENTISTRY.	
Subclass 20—Rubber-dam clamps.....	20
CLASS 36. GAMES AND TOYS.	
Subclass 11—Billiard appliances, cushions.....	69
CLASS 60. HOSE AND BELTING.	
Subclass 4—Hose and tubing.....	180
CLASS 68. LAUNDRY.	
Subclass 33—Wringer-rollers.....	92
CLASS 105. RAILWAY ROLLING STOCK.	
Subclass 119—Springs, coil and rubber.....	40
124—Springs, rubber.....	10
125—Springs, rubber, cup and bed plates ..	31
162—Wheels, tires, cushioned, rubber.....	71
CLASS 120. STATIONERY.	
Subclass 9—Erasers.....	86
11—Fountain-pens.....	326
59—Fountain-pens, special	41
CLASS 128. SURGERY.	
Subclass 19—Nursing-bottles.....	69
25—Syringes.....	335
CLASS 215. BOTTLES AND JARS.	
Subclass 11—Bottle-stoppers, elastic.....	13

This by no means exhausts the list. It does not even touch the electrical field, in which many important uses exist for rubber, nor the inventions in the way of surgical instruments, chemical apparatus, artists' appliances, audiphones, and a host of other things in which the use of rubber is a matter of common knowledge but which cannot be singled out in the patent-office classification. The patents in relation to rubber packings form a case in point.

RUBBER GOODS PRICES IN ENGLAND.

THE lack of uniformity in prices for rubber goods has given trouble enough to manufacturers even in the United States, where the list prices of the leading concerns have long been the same, any variations in the quotations to buyers being made in the shape of different discounts. But the situation is twice as confusing in Great Britain, where every manufacturer has not only a discount sheet different from every other, but also different list prices. This lack of uniformity doesn't matter much so long as any one buyer confines his purchases to the catalogue of a single manufacturer. But there have been cases where a buyer has been approached by salesmen from different houses, each with a different rate of discounts, and he has found, after buying from the salesman offering the best discount, that he really has paid more for his goods than he would have had to pay for any other. The explanation was that the salesman with the largest discount has had the highest list to start with. But the manufacturer has often been confused, as well, and the rival salesmen too. Besides, there has been a lack of uniformity in the prices of a single manufacturer, certain sizes of belting, for example, being relatively much higher than others. This, by the way, is often true of lists issued by American manufacturers. It has been found in England that a shrewd buyer will sometimes, in buying a quantity of rubber goods select from the catalogue of several makers, taking in each case the article which is lowest in price in proportion to real value, and passing over the items which are relatively higher priced.

The English manufacturer, as a rule, is much more inclined to act independently of all his competitors than is the American in the same lines. The North British Rubber Co., Limited (Edinburgh), have scarcely been known to act in harmony with the other British concerns in any case, thereby earning the title of the "Lone Star of the North." But within the past year or so some change in this tendency has taken place, and the India Rubber Manufacturers' Association has come into existence, its first object having been coöperation in the raising of prices to correspond with the increasing cost of raw materials. At the initial meeting, in Manchester, several of the leading firms failed to be represented, with the idea, no doubt, that no good could come from coöperation, but some success having followed the efforts begun at the first meeting for the purpose of putting up prices, nearly all the big concerns united in the second advance.

The executive committee of the association, which has now demonstrated its influence, are now engaged, not in a movement to effect a still further advance in prices, but to secure uniformity in manufacturers' lists. To this end the committee, after consultation with the various firms subscribing to the constitution of the association, have drawn up lists for the various articles embraced under the heading of mechanical rubber goods, which lists will be submitted shortly to all the members of the association, in the hope that the same will meet with approval, and be adopted at the next full meeting. It is believed by the committee that not only will uniformity in lists lessen the tendency to ill considered competition, but that the new lists now proposed will remedy many inequalities in the lists of each individual factory.

The means of communication between the members of the India Rubber Manufacturers' Association is a salaried secretary, whose headquarters are at Manchester. For example, the circular mentioned above will be distributed by the secretary, and any member having a suggestion to make to the association does so through the secretary's office.

THE INDIA-RUBBER TRADE IN GREAT BRITAIN.

[Regular Correspondence.]

FROM what I am able to gather, it would seem that the difficulties in the way of forming the big combine of rubber manufacturers have proved insuperable and it may be taken that the scheme as originally conceived, will be allowed to drop. Among the chief causes which have upset the calculations of the promoters have been the refusal of two of the most important firms to join the combine, and the exaggerated ideas as to the value of their concerns which dominate the minds of the proprietors of the many small rubber firms which are to be found in Great Britain. Other difficulties which always present themselves in the engineering of such a movement have, of course, not been absent on this occasion, but it would serve no useful purpose to discuss the matter in further detail. Although the original scheme in its entirety may be considered defunct, there is, however, talk of a movement of not quite so comprehensive a character. This is a combine of the works which confine themselves wholly, or almost entirely so, to the waterproof garment trade. This scheme is yet but in its infancy, and it will be a month or two before I can say anything definite as to its chances of arriving at maturity. To judge by the present state of this trade, there does not seem any cogent reason why such a scheme should be wanted, because the works affected are all about as busy as they can be and combinations are usually suggested in times of depression rather than of exultation. Of course it is well known that business in this branch of the rubber trade varies a good deal; but that it is exceptionally brisk at the present time is an undoubted fact, and taking the present year of grace throughout, it may be said that the proofing trade has done better than for the last five or six years.

* * *

As I anticipated would be the case, some large orders have been given out by the war office for ground sheets for military purposes, and it is to be hoped that the tendency to consider price before the quality of the proofing has not proved a dominating factor in the placing of the contracts. There certainly has been of late years a good deal of growling at Aldershot with regard to the quality of ground sheets supplied, compared with those of former times.

* * *

I was sorry to hear of the recent destruction by fire of the Gelnhausen Works of the United Berlin-Frankfort Rubber Company. The majority of the rubber works with which I am acquainted, are not situated in positions which attract the lover of nature as well as the antiquarian, but the Gelnhausen works were particularly favored, not only from the verdure surrounding them, but from being within a stone's throw of the ruins of the castle built and inhabited by the Emperor Frederick Barbarossa. Fires in rubber works are not of unusual occurrence, but it is rarely that the whole works are destroyed as seems to have been the case here, to judge from reports in the German papers. As this is only one of the three large works of the company, no doubt the interests of the firm's customers will not suffer to any appreciable extent.

* * *

Those rubber firms who are accustomed at this season of the year to place contracts for chemicals for the next twelve months, will not find any material alteration in prices. Although the price of fuel has gone up 30 per cent., it would be difficult for chemical manufacturers to raise their prices in face of the competition which exists. The principal alteration in price, but one which only affects the elastic thread manufac-

turers to any degree, is the great rise in the price of caustic soda. The English alkali works are very busy at present with orders for home consumption for the mercerizing of cotton, a process which is now being largely used in Lancashire to give a silky appearance to the cotton. The export demand for caustic to various European countries is also very great at present and the rubber manufacturers cannot expect to contract at figures which were obtainable twelve months ago. Various attempts have been made to induce the elastic thread manufacturers to adopt a higher strength and consequently purer caustic than the 60 degrees, but without avail. So far it certainly does not seem to have been shown that 70 degrees soda gives results corresponding with the extra pound per ton which it costs, and some practical trials would seem desirable in order to obtain definite figures whereby the rubber manufacturer might be convinced. For small consumers of caustic soda for desulphurizing purposes, the powdered variety which dissolves at once in cold water is undoubtedly the most convenient form of the alkali, and the labor saved in breaking up and steaming the lump caustic should be borne in mind by those who will not use the powdered on account of its higher price. As regards oxide of zinc, a chemical of such importance in the rubber trade, to judge by the tone of an article which recently appeared in *Engineering*, there is no real reason why such high prices should have ruled during the last year or two. The report that supplies of zinc ore were giving out seems to have had no foundation in fact, and even if some existing mines showed signs of exhaustion, which really seems to be the case in Sardinia, there is undoubtedly plenty of untouched ore in many parts of the world. The American zinc oxide, on account of its containing traces of metals which form dark sulphides, has never been looked upon with favor in this country, and its attempted introduction has met with but scant success. In contradistinction to the general opinion held by rubber manufacturers in Great Britain on this point I may say that one firm, which has had large government contracts, has used the American zinc oxide largely and I was informed by the management that it gave every satisfaction, and what is more, represented a considerable saving in cash over the Vieille Montagne product which is so generally used. Numerous and repeated attempts have been made to introduce lithopore zinc white into this country as a cheaper form of zinc oxide, but I cannot find that any rubber manufacturers have availed themselves of it to anything like the extent desired by those who are interested in its sale. It is chemically a mixture of sulphide of zinc and sulphate of barium, but I do not quite agree with those who say that such a compound can be put together if desired in the rubber works, because in the manufacture of lithopore white the product is the result of chemical precipitation and is therefore in a more intimate state of mixture than can be obtained by mixing the components mechanically together. There are no two opinions as to the necessity for having genuine zinc oxide in the great majority of rubber mixings, and an English chemical firm who not long ago contracted to supply oxide of zinc at a rate below the market value and who recouped themselves by supplying a mixture of barytes and zinc oxide, found themselves in a tight place when damaged goods led to an investigation of the chemicals used. In this case the rubber manufacturer was, in my opinion, largely to blame for contracting at a figure which he should have known could hardly have had reference to the pure oxide.

* * *

The fact that Australia has recently opened a rubber works is hardly likely to be reassuring to those English firms who have been accustomed to do a large export trade in the Aus-

tralasian colonies, more particularly in the waterproof garment business. The firm will undoubtedly be at some disadvantage in having to obtain practically all its raw materials from Europe, otherwise its prospects as regards home trade seem exceedingly good.

* * *

I see a reference in the October number of this journal to the export of almadina, a substance, which by reason of its form, has generally been known as "potato rubber" in this country. On its first introduction about twelve years ago, by Mr. Thomas Christy, of London, some quantities were sold, but I doubt if any of the purchasers ever thought that they had got value for their money. Potato-resin would have been a more appropriate name for the substance, for the rubber-like material which it contained did not, as a rule, exceed 12 per cent., the rest being nearly all resin, and it really is difficult to see how it can be used to advantage in the rubber trade unless at a very low price. The men who had to deal with it used to complain that it was poisonous, though after a close investigation I could find nothing to support this contention. One firm who had found themselves landed with a number of tons of it, managed to use it up slowly in cheap mixings by first melting it into a uniform mass, which when cooled gave a more or less brittle body, easily workable on the rollers. I cannot speak with absolute certainty, but I am pretty confident that none of it is being used in English rubber works at the present time. The rubber manufacturers' idea of its value was about three pence per pound and though there has been plenty of the stuff on offer, the importer and merchant want at least sixpence per pound to make the business worth undertaking. If the substance is being used in America, the fact would not be without interest to the English subscribers to this journal.

THE UNSOLVED SECRETS OF RUBBER.

FOR several years Dr. Carl Otto Weber, the author of a considerable number of papers on the characteristics of India-rubber, has been engaged in experiments respecting the true nature of this material, and of the change which takes place during the process of vulcanization. Were these problems settled, not only could the manufacture of rubber goods be reduced to a more exact science, but the way might be opened to the production of a more satisfactory substitute for India-rubber than is now known, if not the discovery of an artificial rubber. It is understood that Dr. Weber intends to read a paper covering the results of his experiments before the Manchester section of the Society of Chemical Industry at the January meeting.

Considering the incomplete state of the existing knowledge of India-rubber, from the standpoint of the chemistry, it may seem strange that more investigators have not devoted attention to the unsolved problems. The number of investigators has not been small, by any means, but for the most part they have become impressed, at the outset of their work in rubber, with the idea that years of work might be necessary before results of value could be arrived at. It happens that few men of science are able to work from pure love of their profession. Hence, if the reward which they covet is either money or fame, they must devote themselves to fields in which results may be hoped for short of a lifetime. Dr. Weber thinks, however, that a considerable number of investigators might arrange to work in collaboration in connection with rubber, without the neglect of other subjects, and thus hasten the discovery of the secret of its composition as compared with the time required for the same work to be done by one individual.

OBITUARY.

THOMAS JEFFERSON COCHRANE died at Mercy hospital, Pittsburg, Pa., Oct. 27, after a long illness from a complication of diseases. He submitted to an operation two weeks ago, from which he did not recover. He was born at Cochrane's Mills, Armstrong county, 58 years ago, was a son of Judge M. Cochrane, and a half-brother of "Nellie Bly," the well known newspaper woman. He came to Pittsburg over 30 years ago, first engaging in newspaper work. Later he engaged in the rubber business, and at the time of his death was the Pittsburg agent for an eastern rubber company.

MR. MAX FRANKENBURG, proprietor of the Globe Rubber Company, Quebec, died Nov. 14, on the G. T. R. train which arrives at Toronto at 7.15 A. M. He boarded the train at Montreal and went to bed in apparently good health. The porter, in going to wake him as the train was passing Port Union, discovered that he was dead.

When the train arrived in the city the remains were identified by Mr. J. C. Butler, London, Ont., who came to meet Mr. Frankenburg.

THE COX BALL-MAKING MACHINE.

THIS ingenious machine, invented in England, and protected by patents in all leading countries, is regarded by its promoters as likely to revolutionize the manufacture of rubber balls. The Cox machine forms the ball from a single piece of rubber, and that a perfect square. One of these machines, which may be operated by a girl, is placed upon the work table, occupying a space less than a foot in diameter, and only a few inches in height. It consists chiefly of four "leaves," connecting with a lever. The square of rubber, first varnished on the inside with cement, being placed inside the open "leaves" of the machine, the lever is worked by hand, and the "leaves" come together, the corners of the rubber being cut off and the edges of the remainder of the sheet being joined, all within a few seconds. The balls are afterward vulcanized, inflated—and, if required, painted—in the same manner as where balls are manufactured by hand.

The advantages claimed for the Cox machine are: (1) The saving of material, as thinner rubber can be used than in hand work; (2) a thinner joint is effected, which insures a round ball when inflated; (3) the saving in wages in making balls with the machine, as one girl can make three or four times as many balls as by hand; (4) the saving of half the wages for cutting out the pieces; (5) the great saving of space, which will lessen the charge for rent. In actual commercial operation the Cox machine is asserted to have effected a saving of 62½ per cent., as compared with hand work, in the processes involved from forming the rubber into sheets until the balls reach the molds in which they are vulcanized. In other words, the labor cost on a certain number of balls, for the processes referred to would be 15s. if made by hand, and only 5s. 7½d. where the machine is used. This would mean a saving of £468 15s. in the cost of the number of balls in stock at this time in the factory which furnishes this comparison.

The machine is now in use by The Eccles Rubber and Cycle Co., Limited, at Eccles, Manchester, England, who acquired in 1897 the plant of the Hille India Rubber Co., Limited, which had been established for the manufacture of rubber balls by another process. The factory has been enlarged, and much new plant laid down, including a 700 horse power steam engine. Besides rubber balls, the output includes tire covers and inner tubes for the trade. The company also have acquired The New

Cooper Cycle Fitting Co., Limited, engaged in making cycle accessories, at Birmingham, the plant of which is also being extended. The capital of the Eccles company is £100,000; the managing director is Mr. Charles Coops, lately of the cycle trade in Liverpool; the chairman of the board is Mr. Louis Sgal, formerly prominent in the Liverpool crude rubber trade.

The German rights for the Cox machine have been disposed of to the new Colonial Rubber Société Anonyme, with a capital of 2,500,000 francs, who have established a factory at Cologne-Ehrenfeld. The same company have acquired also the rubber works of the brothers Polydore and Hypolite de Schampelaere, at Gand, where the Cox machine will be operated under the Belgian patents. They have also acquired a rubber works in France, where the patents for that country will be worked. The promotion of these companies has been the work of Mr. Sgal, the capital being supplied largely by the Credit General de Belgique, in Brussels.

The owners of the Cox patents—also described as the Eccles patents—are now engaged in negotiations for the use of the machines in the United States.

THE *Boston Herald* is authority for the statement that a rubber shoe factory is to be started in Hudson, Mass., and that ex-Congressman Apsley, who already operates an extensive rubber manufactory in the town, is prominently identified with the matter. It is proposed to erect a four-story brick factory near the present works of the Apsley Rubber Company, 225 feet long and 60 feet wide, to be used in making rubber boots and shoes, and to give employment to more than 500 operatives.

WHEN the Wales Goodyear Company began making the little Miniature Boots, some seven or eight years ago, they hardly thought that they were introducing a style of foot-wear for which there would be a constant demand. Such has proved to be the case however. Though the novelty of the "Miniatures" has worn off, people are just as anxious to get them now as ever. Nothing pleases the children quite so much as a pair of these little boots. The retailer has also found that they serve an excellent advertising purpose. A pair of these little "Miniatures" set up in a window side by side with a pair of full-grown boots will attract a vast deal of attention. The company mails them to any address for 20 cents.

GRAPHITE is the name of a bright four-page paper published by The Jos. Dixon Crucible Co., and devoted wholly to points concerning the multitudinous uses of graphite. The technical points given chiefly refer to paints, but as the publishers announce the completion of volume one with the November number, and promise to do better next year, it may be that they will give the India-rubber trade some points on the use of graphite in packings.

TO MEND RUBBER SHOES.—Rub the patch to be applied and the overshoe very thoroughly with sharp sandpaper, then smear both with rubber cement, five times, letting them dry each time. Smear both the sixth time and, before they dry, apply the patch, using prolonged pressure, if possible. If rubber cement is not obtainable, dissolve small pieces of pure rubber not that which is vulcanized, in warm spirits of turpentine until it is of the consistency of syrup.

FOURTEEN establishments in Connecticut engaged in the manufacture of rubber goods reported to the state bureau of labor statistics on July 1, 1898, that they had 4255 employes on their pay rolls—an increase of 4.6 per cent. over the number employed one year before. The amount paid in wages during the same period increased 32.7 per cent., and the proportion of business done of full capacity was reported as being 91.7 per cent. in 1898; 72 per cent. in 1897; and 63.7 per cent. in 1896.

NEWS OF THE RUBBER TRADE.

VEREINIGTE GUMMIWAAREN FABRIKEN, HARBURG-WIEN.

THE annual report of this great company has just been presented to the board of directors. Expectations that the price of crude rubber would drop to a normal basis, have not been realized. On the contrary, prices have gone still higher, necessitating a greater outlay for raw material, amounting to Mk. 1,084,726 more than the year before. Coal and wages are also higher. The sale of rubber shoes was not satisfactory, owing to the open winter. The managers were prevented from raising prices of manufactured goods owing to the sharp competition of the seven Austrian rubber companies. Measures have been taken to come to an understanding with these companies, hitherto, without any tangible results. Net profits amounted to Mk. 866,644. A dividend of 12 per cent. on the entire capital stock of Mk. 6,000,000 will be declared. As you have already been informed, the capital stock was lately increased 1,500,000 Marks for purchasing the plant at Linden, Hanover, for which Mk. 250,000 were paid. This latter investment has proved a profitable one, and will, doubtless, fulfill the most sanguine expectations. The real estate and machinery owned by the company represent a value of Mk. 3,477,115; material and stock on hand, Mk. 405,333. This falling off in the receipts of the largest of German rubber companies is, in the opinion of the writer, not only due to the rise in price of crude rubber, but is also owing to the inroads already made by the Russian rubber shoe manufacturers, whose shoes can be found in almost every rubber store, from the North sea to the Tyrolean Alps. It is a pity Americans cannot be wide-awake enough to also share in the profits of this branch.

AMERICUS.

Berlin, October 20, 1899.

THE MELBOURNE RUBBER FACTORY.

At the formal opening of the Pioneer India Rubber Works of Australia—Barnet Glass & Sons, proprietors—at Kensington, near Melbourne, the engine which drives the machinery was started by Mr. R. W. Best, minister of trade and customs for Victoria. Mr. Barnet Glass showed the visitors through the works, where all the various processes were to be seen, from the handling of the raw rubber to the proofing of cloth and the turning out of garden hose. Afterward luncheon was served, and in response to toasts Mr. Best, Postmaster General Duffey, and others complimented the Messrs. Glass, who have been interested in the India-rubber trade for twenty years, upon their enterprise in erecting works for the manufacture of rubber goods as a domestic industry. Already contracts have been made for supplying the railway and postal services in the colony of Victoria with rubber goods, and the firm hope that, when the federation of the Australian colonies has been fully accomplished, their goods will be used by the government throughout the commonwealth. It was mentioned at the opening exercises that some of the raw rubber used had come from New Guinea, which is likely to become included in federated Australia, after which New Guinea rubber may be regarded as a domestic product. The greater part of the rubber used thus far, however, has come from Liverpool, the first order for the new factory having been placed there four months before the opening above reported.

TIRE SITUATION IN AUSTRALIA.

A WRITER in *The Cycle Age* (Chicago) suggests that there is a good field in New Zealand for an American bicycle tire company. The best known American wheels are in use there, but invariably supplied with Dunlop tires. One dealer is quoted as saying that the bicycle trade has enough to do to sell wheels;

they cannot fight the battles of the tire companies. The Dunlop company charge the trade \$16 for a pair of tires and stipulate, that covers shall retail at \$7 each; tubes, \$2; and steel rims, \$1.50. The writer adds that there is no patent protection in Australia and New Zealand for Dunlop tires.

NEW INCORPORATIONS.

THE New Era Rubber Co. (Kittery, Maine) under Maine laws, October 14, 1899. Formed for manufacturing and dealing in rubber, its substitutes, in its crude form, or otherwise; capital, \$1,000,000. President: W. H. Southwick, Lynn, Mass.; Treasurer: Herbert H. Pratt, Swampscot, Mass. (Nothing paid in.)

=American Rubberine Co. (New York City, N. Y.) under Delaware laws, October 13, 1899; capital, \$250,000.

=Missouri Coffee & Rubber Co. (East St. Louis.) To cultivate and market coffee, rubber, etc.; capital, \$150,000. Incorporators: H. W. Conner, J. R. Kersten, R. A. Jones, all of East St. Louis.

=New Bedford Rubber Co. (New Bedford); to buy and sell rubber goods, Gutta-percha, etc.; capital, \$5000. Incorporators: J. W. Cross, K. W. Hayward, T. L. Hayward.

=Crown Rubber Co. (Hartford, Conn.), under Connecticut laws; capital, \$10,000, divided into 100 shares. Incorporators: J. A. Pitkin, A. P. Towne, and Arthur H. Bronson.

=Calumet Rubber Tire Co. (Chicago, Ill.); capital, \$150,000. Incorporators: E. A. Hill, G. C. Aldrich, K. W. Kinney.

=The Pan-American Rubber Co. to trade in rubber and tobacco, capital \$1,000,000. Incorporated under the laws of New Jersey. Incorporators, Benjamin H. Adams, George G. Bradley, Arthur H. Howland.

=The Chicago Rubber and Heel Manufacturing Co., Chicago, Ill., has recently been incorporated. The incorporators are A. A. Worsely, John H. Winslow and Frank Morgan.

=The National Rubber Co., of Canada, has been formed by Philip B. Glickman, Philip Glickman and Levi M. Rosenthal.

BRITISH TRADE NOTES.

THE Riverside Rubber Co. (Belleville, N. J.) have placed the English agency for their "New Seamless" hot water bottles and other druggists' sundries in the hands of Lewis & Burrows, Limited, pharmacists, 108, New Oxford street, London, W. C.

=The Single Tube Tires, Limited, is the new style under which is now conducted the single tube tire business organized in London a few years ago, by a combination of American manufacturers. Owing to changes in the relations of the American companies at home, only the B. F. Goodrich Co. are now interested in the English corporation, which remains under the management of R. M. Howison, 7, Snow hill, London.

=The report of the directors of The Clipper Pneumatic Tyre Co., Limited, at the meeting of shareholders at Birmingham on November 7, stated that the sale of their tires had been well maintained, and that arrangements had been made for an increased output for the next season. The surplus from the year's trading reached £15,871 17s. 11d., which permitted of the payment of a 6 per cent. dividend (£7805 5s. 8d.), writing off sundry accounts, and carrying over £4882 6s. 7d., against only £2548 os. 1d. last year. The board embraces E. J. Byrne, who is managing director of the Rubber Tyre Manufacturing Co., Limited, of Birmingham.

=W. Round Sanderson has resigned as manager of the Liverpool depot of the Liverpool Rubber Co., Limited, to become connected with The Yorkshire County Cycle Co., Limited (Leeds).

TRADE NEWS NOTES.

THE export of automobiles and parts of such vehicles from the United States has begun. Two recent shipments to Harve aggregated \$3700 in value, and one to London \$1800. Doubtless the export of American rubber tires for automobiles will follow.

=The United States sugar refinery's glucose factory at Waukegan, Ill., is now running with a force of 300 men. The new dry starch and rubber departments have been started making the by-products named.

=The record of the Hazleton boiler in rubber mills is unusual, for in no instance have the boiler inspectors cut down the pressure, while repairs for the entire period of their use have been almost nothing.

=Edward R. Taylor (Cleveland, Ohio), who as manufacturing chemist has supplied the rubber trade with many valuable specialties, is erecting a large plant at Penn Yan, N. Y., having moved there from Cleveland, Ohio.

=The Royal Bavarian Court Rubber Factory, Metzeler & Co. (Munich), who have been established thirty years and employ about 500 workpeople, are about to establish a selling branch in London. It is understood that it will be in charge of Gus L. Hille.

=The stockholders of the Peoria Rubber and Manufacturing Co., which is an Indiana corporation, though engaged in business in Illinois, met at Marion, Ind., on August 18, at which time they are reported to have voted to sell out to the proposed American Bicycle Co., taking payment presumably in cash and shares on the basis already outlined in this paper.

=Under the name Dirigo Rubber Co. is conducted the mechanical rubber goods trade of John M. Watt's Sons, dealers in engineers' supplies, No. 136 Liberty street, New York. One of the specialties of the firm is "Dirigo" gum core packing.

=Morgan & Wright (Chicago) are coming to the front as manufacturers of rubber carriage tires.

=The neat cut glass jar filled with rubber nipples, which is seen on so many druggists' counters and in most of the rubber stores, bearing the word "Tyrian," is a very taking device adopted by the Tyer Rubber Co. (Andover, Mass.) for keeping their excellent goods before the public.

=Eugene Arnstein (Chicago), manufacturer of bicycle material and supplies, in writing to THE INDIA RUBBER WORLD in relation to having requirements for crude rubber filled, says "We have been consumers of this article for several years past and our requirements in this line are constantly increasing."

=M. J. Gilbo, of the Akron Machine Co., Akron, O., is said to have purchased the plant of the Valley Rubber Co., New Philadelphia, Ohio, and will soon organize a company and start manufacturing rubber goods.

=The New Jersey Rubber Co. have just completed an addition to their reclaiming plant at Lambertville, N. J., in the shape of a three story brick building 41 x 66 ft., in which is placed the latest automatic machinery.

=The man with the hose has been so extensively advertised that an enterprising Chicago house have issued a picture of "the man with the hose" with apologies to Millet. Now all that is needed is to have some poet immortalize the picture and at the same time assist W. D. Allen & Co., in making their goods known the world over.

=Mr. Arthur Reeve, who has charge of the manufacture of the Woonsocket and Wales Goodyear shoes was recently made the subject of a very flattering sketch in the *Providence Evening Bulletin*. It seems that Mr. Reeve was until lately a resident of Cranston, which is a delightful suburb of Providence, and that he took a decided interest in educational matters.

Indeed, he was the prime mover in getting a magnificent school building located there, and in having the matter properly financed. The concentration of the rubber shoe business around the New York and Boston offices made it necessary for him to remove to Boston, and Cranston, therefore, is in mourning.

=Although the factory of the Beacon Falls Rubber Co., was a very large one, it has been found necessary to make substantial additions from time to time, and the company have now in process of construction, another large building.

=A series of forty extremely interesting photographs have been taken of the interiors of The Hood Rubber Co.'s factories at East Watertown, Mass. One set of these photographs will be exhibited at the Paris Exposition.

=The Monarch Rubber Co., St. Louis, are pushing their factory very rapidly, and expect to be manufacturing by February.

=Mr. F. N. White, President of the Atlantic Rubber Co., Providence, is an exceedingly busy man these days, his time being equally divided between Providence and New York.

=The United and Globe Rubber Mfg. Cos., Trenton, N. J., make no secret of the fact that their business has marvelously increased during this year. The November shipments for 1899 were nearly three times as large as those of the year previous.

=The factory of the Home Rubber Co., Trenton, N. J., is so busy that Supt. Chas. B. Stokes is contemplating running over time, an unusual state of affairs for this time of year.

=Voorhees Rubber Mfg. Co., Jersey City, N. J., are steadily pushing ahead. The latest evidence of this, is an addition to their plant and the installation of new machinery.

=Probably the most expensive vulcanizer in use to-day is one at the factory of the Lowenthal Rubber Co., Jersey City, N. J. This vulcanizer is 40 feet long, 5½ feet in diameter, is made of steel, and cost \$7000. It devulcanizes 32 tons of stock at a time.

=An exceedingly spirited picture is the chariot race scene done in yellow and black, advertising the Easy Rubber Vehicle Tire, of the Whitman & Barnes Mfg. Co., Akron, Ohio. The peculiar shade of yellow, by which this banner is characterized is notable in all of the Whitman & Barnes advertising. Catalogues, circulars, flyers, golf ball-literature and wrappings, all being done in yellow and black, in fact, this combination of colors amounts almost to a trade mark, and is really in itself a good bit of advertising.

=Mr. J. O. Stokes, general manager of the Home Rubber Co., Trenton, N. J., has just returned from a ten days' trip among his agencies in the West, and in response to an inquiry prophesies the biggest hose season that the trade has yet seen.

=The Pennsylvania Rubber Co., Erie, Pa., have opened branch stores in Chicago and in Buffalo. The former is at 79 East Lake street, and is in charge of Robert M. Stuart, the Buffalo branch being in charge of R. M. Frazer, and located at 200 Pearl street.

=Quality rather than quantity is the Lycoming Rubber Company watch-word. They do not pretend to manufacture 50,000 pairs a day, although their output is of very considerable size and increasing every year; but they do contend, and they have substantiated their contention for many years, that no imperfect goods ever leave the Lycoming factory.

=Mr. F. D. Mullan, general superintendent of the Manufactured Rubber Co., Philadelphia, Pa., has been invited to lecture before the Franklin Institute on "Rubber Substitutes and their Application to the Arts."

=The Seamless Rubber Co. (New Haven, Conn.), have purchased the Geo. H. Scranton property which adjoins their own and now have with the new brick factory buildings just erected, together with the large brick buildings comprising the Scranton

mills, an exceedingly large and well arranged plant, a detailed description of which will appear in a later issue. General manager Geo. M. Allerton is fast earning the reputation of being one of the most progressive men in the whole trade.

=The New Haven *Leader*, being printed in the same place where the Candee factory is, and consequently being interested in rubbers, had the following to say in a recent issue about the rubber season:

"The United States Rubber Co., of which the L. Candee Company of this city is a branch, is overwhelmed with orders, and the prospect for business throughout the entire winter is of the best.

"The business of the United States Rubber Company has been better this year than it was last; all the mills having been running on full time."

=The greater part of the rubber footwear recently contracted for by the government is being made at the factories of the United States Rubber Company.

Chill autumn's melancholy days,

The dead leaves drift through dreary street;

Now all who walk in wisdom's ways,

Will walk with rubbers on their feet.

—From United States Rubber Co.'s Calendar.

=The Cable Rubber Co., Jamaica Plain, Mass., have recently increased their machinery and dry heaters so that they have about double the capacity of last year.

=A new rubber company is about to be incorporated in Massachusetts which will occupy a large plant near Salem. The company will absorb the Clifton Rubber Mfg. Co., and in addition will manufacture rubber shoes. The company will be capitalized for \$250,000, and will be financed by Mr. G. H. Coyle, and well known Boston capitalists.

=Another addition to the factory of Geo. Watkinson & Co., Philadelphia, is for the purpose of manufacturing wool-boots. This part of the business will be under the care of Mr. Oldroyd, the veteran wool-boot manufacturer of Middletown, N. Y.

=Chester J. Pike, selling agent of the United States Rubber Co., announces that the lasts for the Wales-Goodyear and Woonsocket for the coming season will be far ahead of anything yet attempted. In other words, that the new styles are to be perfect.

=The Dontslip Heel & Sole Co. is the name of a new rubber company formed in Boston who have purchased a plant in Somerville, Mass., and are making a heel and sole of rubber and cork compounded and vulcanized together.

=Alfred Hale, the veteran manufacturer of diving armor, has all he can do in his South Boston factory, his goods being used in diving operations the world over. In an experience of fifty years he has found nothing so generally satisfactory as old Fine Para and he uses it conscientiously both in frictions and coatings.

=John Kearns, a well known New England expert in rubber, has gone to Akron, Ohio, as superintendent of the factory of the India Rubber Co.

=The first shoes were made at the Concord Rubber Co.'s works at Concord Junction, Mass., on November 8—the heat coming out nicely and the goods being in style and finish all that could be desired.

=One of the best paying rubber specialties that has ever been brought out is the Eagle Dress Bone patented by Mr. Janowitz, the son-in-law of the veteran dress-shield manufacturer, I. B. Kleinert.

=The A. C. Squires Rubber Co. is the name of a new con-

cern soon to be incorporated in New York for the manufacture of dress shields, coatings, dental rubber, dental dam, elastic bands and pure gum specialties. The president and general manager will be Arthur C. Squires, formerly with the I. B. Kleinert Rubber Co., as manager of their factory E.

=Mr. William D. MacKay, who has for some years past been connected with the Gutta Percha and Rubber Mfg. Co., New York, as traveling salesman in Chicago and on the Pacific coast, has severed his connection with that concern to go in business for himself in San Francisco.

=It is probable that no one in the mackintosh trade has a wider acquaintance, or is more deservedly popular than Mr. Churchill, of J. Galt Smith & Co., New York. The news that he is going abroad for a year to rest brings up the thought on many minds of how genuinely he will be missed.

=The most beautiful calendar of the year is one in colors which relates to pretty girls, sweet children, and sturdy miners, as far as the illustrations go, and while all of them are rubber clad as to their pedal extremities, there is no suggestion at all of advertising. The careful searcher will find after a time the modest line, "Copyrighted by the United States Rubber Co." but even then so inoffensive is this, that the calendar is bound to take a foremost place among the household gods.

=Mr. J. W. Carey, formerly superintendent of the Morgan & Wright factories, Chicago, has accepted a position with the Alden Rubber Co., Barberton, Ohio.

=Mr. F. E. Ramey has erected a large storehouse in Akron, Ohio, and will put in a stock of general mill supplies, his specialty, however, being to supply the wants of the various rubber factories in that vicinity.

=The Hood Rubber Co., Boston, Mass., have increased their capital stock to \$600,000.

=The Hall Brothers, who are the Boston agents of the Automobile and Vehicle Tire Co.'s sectional carriage tire (F. C. Hall's patent) are sons of the patentee of the tire, and belong to the third generation of Halls who have been active and successful rubber men in Boston.

=The International Automobile and Vehicle Tire Co., have moved their main offices from 64 Federal street, Boston, to the New York Life Building, New York.

=The suit of the Hall Rubber Boot Co. against certain factories in the United States Co., for royalties on the Hall patent rubber lined boot, was lately settled out of court, and so it is gossiped in a manner quite satisfactory to Mr. Frank A. Hall.

=Mr. S. B. Rosenthal, a well-known mackintosh merchant, announces that he is soon to open a jobbing house in mackintoshes, which will be located in the West.

=Mr. Aaronson, of the Union Rubber Co., Boston, Mass., has just returned from a most successful Western trip.

=The industry of making dies for rubber factories is gaining a strong foothold in Brockton, Joseph O. Tougas & Co., for example, having just completed an order for a full equipment of dies for a factory in Montreal, and another for full sets of dies for the rubber factory at Port Dalhousie, Canada.

=Lapworth & Son's elastic fabric mills at Milford, Mass., are doing a fine business and have just put in six new looms. Orders for large amounts of goods are on hand.

=During the past year the Diamond Rubber Co. (Akron, Ohio) has increased the wages of the men 15 per cent. Mr. Marks also mentions the fact that the company has increased its working force since 1896 from 150 to 350 hands.

=C. B. Raymond, manager of the Akron branch of the American Hard Rubber Co., states that the company employs 350 people, an increase of 250 during the past three years.

=Mr. J. W. Ellsworth, president of the Rio Nichol, and director of the Palenque and Chiapas Rubber Plantations and Investment Companies, visited the City of Mexico recently. He is engaged solely in rubber culture, having purchased 25,000 additional acres in Chiapas while there a few weeks ago.

=The I. B. Kleinert Rubber Co. have erected a new one-story (50x50) addition to their factory at College Point, Long Island.

=The Pennsylvania Rubber Co. (Erie, Pa.) are building an addition to their factory and raising the roof of the main mill, thus giving an additional story, all of which is warranted by a press of business.

=Mr. George E. Hutchins, for many years president and business manager of the Lowell Rubber Co. (Lowell, Mass.) has severed his connections there, and rented a store on 107 Central street, where he will open a new stock of carefully selected rubber goods. Mr. Herbert W. Hesleton, for many years clerk with the Lowell Rubber Co., will remain with Mr. Hutchins.

=The Byfield Rubber Co. (Bristol, R. I.) were compelled to shut down recently while installing new machinery, but started up on November 6, and are now running night and day.

=The machinery for the Model Rubber Co. (Woonsocket, R. I.) having arrived, it is expected that they will soon begin manufacturing and that their goods will be on the market this month.

=The Hood Rubber Co. (Watertown, Mass.) recently placed an order with F. A. Wendell Plumbing and Heating Co., to install all new plumbing on their first and second floors with sheet lead, the third and fourth floors having already been installed by them.

=The Monarch Rubber Co. have announced their intention to manufacture rubber boots and shoes as well as ponchos for army use, in a portion of their plant at Campello, Mass.

=A new warehouse is now under construction for the Canadian Rubber Co., Montreal, the establishment to occupy the entire block which faces Craig, St. Adolphe, Notre Dame streets and Papineau square. The present warehouse on Papineau square will remain, and the addition will bring the dimensions to 180 by 170 feet.

=A strike occurred at the factory of the Dickinson Hard Rubber Co., the 23d of last month. The strikers' places were immediately filled by competent men and before night things were going on much the same as usual.

=The Goodyear Rubber Co. (St. Paul, Minn.) will move November 1 from their location on Seventh street to 375 Sibley street, where after January 1 they will do only a wholesale business in rubber goods.

=The Rubber and Cement Works of Robert H. Foerderer & Co., Wheatshaf lane, Philadelphia, Pa., were completely destroyed on the morning of October 26 the loss being estimated from \$17,000 to \$25,000. It is fully covered by insurance. Seven hunting dogs, valued at \$100 each, perished in the fire. John B. Craig, watchman, was badly burned.

=Mr. W. Harrison Mason (San Jose, Costa Rica) has been in New Orleans, La., recently, for the purpose of establishing a rubber manufacturing concern there.

=It is rumored that the Victor Rubber Co. (Springfield, Ohio) are to locate a new factory at Indianapolis, as it has an immense trade in Indiana and Michigan and wants a new factory there because it can better handle this trade from Indianapolis than any other point.

=The Continental Caoutchouc and Gutta Percha Works Hanover, Germany, have a enviable record as pneumatic tire manufacturers, their product for '99 being nearly 700,000 tires.

=The partnership heretofore existing under the firm name of The Rubber Alphabets Co., Meriden, Conn., has been dissolved by mutual consent, J. U. Foster retiring because of advancing age. Mr. J. Herbert Foster having bought the interest from James U. Foster, and with Wallace H. Miller will continue the business under the firm name of The Rubber Alphabets Company.

=E. D. Hewins, Boston, who is well-known in fabrics, has opened an office for himself at No. 72 Lincoln street, and will hereafter act as handler of duck, drill and other fabrics used in rubber mills on his own account.

INDIVIDUAL MENTION.

=At the recent auction sale of boxes of the National Horse Show Association, of New York, Mr. Wm. B. Banigan was quoted as one of the wealthy men who paid \$400 for a box.

=Mr. J. R. Livesey, of the rubber house of Livesey & Co., Liverpool, Eng., was a recent visitor to the United States.

=Mr. Charles E. Longden, superintendent of the Seamless Rubber Co., New Haven, Conn., has taken a long needed vacation, two weeks of which was spent in hunting and fishing.

=Mr. Adolph Prinzhorn, director of the Continental Caoutchouc & Gutta-Percha Company, Hanover, Germany, is visiting the United States at the present time.

=Mr. F. L. Smith, president of the Byfield Rubber Co., Providence, R. I., has been spending a couple of weeks with his family at the Laurel House, Lakewood, N. J.

=Mr. Charles N. Candee, secretary of The Gutta-Percha and Rubber Manufacturing Co. of Toronto, Limited, was a recent visitor to the offices of THE INDIA RUBBER WORLD.

=Vice-President Garret A. Hobart, whose death is so generally mourned was to an extent a rubber manufacturer, as he was part owner and treasurer of the Bloomingdale Soft Rubber Works, Bloomingdale, N. J.

=Mr. A. F. Townsend, Vice-President of the Manhattan Rubber Mfg. Co., has been quite ill for some time past with malarial fever. He is, however, improving, which will be good news to his many friends throughout the trade.

=Mr. E. C. Fuller, of the Franklin Rubber Co., Boston, Mass., is very ill with typhoid fever. Another member of the trade who is suffering from this same dread disease is Mr. Tracy Lewis, treasurer of the Beacon Falls Rubber Co., Beacon Falls, Conn.

=Mr. Arthur H. Stedman, of the firm of George A. Alden & Co., and Mr. A. H. Brown, assistant to Mr. Yeoman's, purchasing agent, of the Boston Rubber Shoe Co., are both in Pará, and the cable assures their many friends that they are safe and well.

=Mr. Harry Ballou, of the Joseph Banigan Rubber Co., was recently married to Miss Alice Sanders, of West Newton. The bridegroom is a nephew of the president of the Joseph Banigan Rubber Co., while the bride is the daughter of Mr. Charles A. Sanders, of the Denison Mfg. Co., of Boston.

=The wedding of Miss Maud Lillian Marshall, of Cambridge, and Eben F. Dewing, of Revere, cashier of the Boston Rubber Shoe Co., took place on the evening of October 25, at the home of the bride's parents. After a three weeks' tour Mr. and Mrs. Dewing will reside in their newly completed house on Bartlett avenue, Arlington, Mass.

=The wedding of William McCaw, pay clerk at the factory of the National India Rubber Co. (Bristol, R. I.) and Isabel Rose Bowen, who has been employed in the stitching room at the factory, took place October 25, at the home of the bride. The rooms were beautifully decorated, and the happy couple left Bristol for a short wedding tour, amidst congratulations from their many friends.

REVIEW OF THE CRUDE RUBBER MARKET.

OF special interest in the market at present has been the sharp rise in Para grades that has taken place in the last ten days. Fine that last month sold for 1.05 is to-day selling at 1.10. The Africans however did not show the same advance with the exceptions of Lopori and Equateur which advanced in about the same proportions as Para. A decrease in the visible supply and the general activity of the manufacturers the world over gives promise of continued high prices. When one considers that all rubber goods because of the rise in crude rubber, reclaimed rubber, fabrics, etc., are costing the manufacturers from 15 to 20% more than they did two years ago, a marked increase in prices of manufactured goods appears to be certain and speedy.

The latest quotations in the New York market are:

PARÁ.		AFRICAN.	
Islands, fine, new....	107 1/2 @ 108	Tongues.....	63 @ 64
Islands, fine, old.....	110 @ 111	Sierra Leone.....	54 @ 55
Upriver, fine, new....	110 @ 111	Benguella.....	79 @ 80
Upriver, fine, old.....	112 @ 113	Congo ball.....	65 @ 66
Islands, coarse, new....	70 @ 71	Cameroon ball.....	63 @ 64
Islands, coarse, old....	none here	Flake and lumps.....	48 @ 52
Upriver, coarse, new....	90 @ 91	Accra flake.....	23 @ 24
Upriver, coarse, old....	92 @ 93	Accra buttons.....	70 @ 71
Caucho (Peruvian) sheet	66 1/2 @ 67	Accra strips.....	73 @ 74
Caucho (Peruvian) strip	none imported now.	Lagos buttons.....	70 @ 71
Caucho (Peruvian) ball	81 @ 82	Lagos strips.....	70 @ 71
CENTRALS.		Liberian flake.....	@
Esmeralda, sausage....	77 @ 78	Madagascar, pinky....	84 @ 85
Guayaquil, strip.....	64 @ 66	Madagascar, black....	59 @ 60
Nicaragua, scrap....	76 @ 77	GUTTA-PERCHA.	
Mangabeira, sheet.....	62 @ 63	Fine grade.....	1.75
EAST INDIAN.		Medium.....	1.45
Assam.....	79 @ 82	Hard white.....	1.20
Borneo.....	39 @ 54	Lower sorts.....	65
		Malata.....	

Late Pará cables quote:

	Per Kilo		Per Kilo.
Islands, fine	113 50	Upriver, fine.....	135 00
Islands, coarse	69 50	Upriver, coarse.....	108 00
Exchange 62 3/4.			

NEW YORK PRICES FOR OCTOBER. (NEW RUBBER.)

	1899.	1898.	1897.
Upriver fine.....	1.03 @ 1.05	89 @ 96	87 1/2 @ 88
Upriver coarse.....	81 @ 84	79 @ 85	60 @ 65 1/2
Islands fine.....	97 @ 99	85 @ 94	85 @ 86
Islands coarse.....	61 1/2 @ 64	58 @ 65	52 1/2 @ 55
Cametá coarse.....	63 @ 65	59 @ 67	55 1/2 @ 61

In regard to the financial situation, Albert B. Beers (broker in India-rubber and commercial paper, No. 58 William street, New York) advises us as follows:

"During October the money market has been so tight, with such high rates ruling for call money and collateral loans, that there has been very little demand for paper from out-of-town banks, and practically none in the city, and while rates have been quoted as nominally 5 1/2 to 6% for the best rubber paper, and 6 to 7% for names not so well known, it has been difficult to place much even at these rates."

THE ANTWERP MARKET.

TO THE EDITOR OF THE INDIA RUBBER WORLD: Yesterday's sale by inscription was firm and prices show an advance on valuations of about 1%, so that the prices paid in last sale of 3d inst. fully maintained themselves.

In Congo sorts 84,534 kilos were offered and of other sorts 1,998 kilos, all of which was sold.

The next sale by inscription will take place on December 8,

details of which will be published in a few days. The stock on hand on the 16th inst. was about 196 tons.

On the 28th inst. about 62 tons Haut Congo Lopori will be sold by inscription, expected to arrive by steamer *Leopoldville* at the end of the present month.

Yours truly,

C. SCHMIDT & CO.

Antwerp, November 17, 1899.

STATISTICS OF PARA RUBBER (METRIC TONS).

	NEW YORK.		Totals, 1899.	Totals, 1898.	Totals, 1897.
	Fine and Medium.	Coarse.			
Arrivals, October.....	705	421 =	1126	492	663
Aggregating.....	969	494 =	1463	620	1020
Deliveries, October.....	790	443 =	1233	469	735
Stocks, October 31....	179	51 =	230	151	285

	PARÁ.			ENGLAND.		
	1899.	1898.	1897.	1899.	1898.	1897.
Arrivals, October.....	2256	1900	1870	690	960	495
Aggregating.....	2596	2335	2365	1120	1705	995
Deliveries, October....	2059	2015	1672	625	850	575
Stocks, Oct. 31....	537	320	693	495	855	420

	1899.	1898.	1897.
World's supply, Oct. 31 (excluding Caucho)...	2238	2462	2200
Pará receipts, July 1 to October 31.....	5895	6160	5640
Afloat from Pará to United States, Oct. 31....	376		
Afloat from Pará to Europe, October 31.....	663		

IMPORTS FROM PARA AT NEW YORK.

[The figures denote weight in Pounds.]

October 27.—By the steamer *Fluminese*, from Pará:

IMPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Total.
New York Commercial Co..	163,200	44,600	34,000	1,600 =	243,400
Crude Rubber Co.....	105,300	21,800	39,800		166,900
Reimers & Meyer.....	56,000	41,100	53,000		150,100
Albert T. Morse & Co....	71,900	9,800	33,300	600 =	115,600
Otto G. Mayer & Co.....	41,900	6,300	10,700		58,900
Lawrence Johnson & Co..	23,900	2,200	7,000		33,100
Edmund Reeks & Co.....	16,400	1,500	4,100		22,000
William Wright & Co.....			14,100		14,100

Total... 478,600 127,300 196,000 2,200 = 804,100

November 4.—By the steamer *Grangese*, from Manáos and Pará:

Reimers & Meyer.....	142,900	46,700	66,500	10,800 =	266,900
New York Commercial Co.	61,300	7,400	52,500	900 =	122,100
Albert T. Morse & Co....	41,000	6,000	59,500	4,200 =	110,700
Crude Rubber Co.....	50,000	7,500	23,800		86,300
Lawrence Johnson & Co..	42,000	6,800	20,200		69,000
Boston Rubber Shoe Co..	32,500	4,100	12,600		49,200
Otto G. Mayer & Co.....	15,700	700	20,500		36,900
Edmund Reeks & Co....	13,300	1,400	4,200		18,900
George G. Cowl.....	6,400	700	1,500		8,600
William Wright & Co....			4,400		4,400

Total... 405,100 81,300 270,700 15,900 = 773,000

November 18.—By the steamer *Bernard*, from Manáos and Pará:

New York Commercial Co.	185,200	25,000	62,000	4,000 =	276,200
Crude Rubber Co.....	166,800	27,100	36,900	1,400 =	232,000
Reimers & Meyer.....	132,400	34,300	63,200	12,200 =	242,100
Boston Rubber Shoe Co..	89,000	13,100	24,000		126,100
Albert T. Morse & Co....	48,600	11,700	27,400	1,800 =	89,500
Otto G. Mayer & Co....	54,400	13,000	11,600		79,000
Edmund Reeks & Co....	33,900	5,500	5,600		45,000
Kunhardt & Co.	29,200	11,700	900		41,800
Lawrence Johnson & Co..	26,000	6,900	4,400		37,300
George G. Cowl.....	6,400	1,100	1,500		9,000
Hagemeyer & Brunn....	2,500		1,100		3,600

Total..... 774,600 149,400 238,600 19,400 = 1,182,000

PARA RUBBER VIA EUROPE.

POUNDS.		
OCT. 23.—By the <i>Etruria</i> =Liverpool:		
Reimers & Meyer (Coarse).....	11,500	
A. T. Morse & Co. (Coarse).....	25,300	36,700
OCT. 23.—By the <i>La Bretagne</i> =Havre:		
A. T. Morse & Co. (Coarse).....	11,500	
OCT. 25.—By the <i>Teutonic</i> =Liverpool:		
Reimers & Meyer (Fine).....	7,000	
Albert T. Morse Co. (Coarse).....	4,700	11,700
OCT. 28.—By the <i>Campania</i> =Liverpool:		
Reimers & Meyer (Fine).....	25,000	
NOV. 10.—By the <i>Cervic</i> =Liverpool:		
Albert T. Morse & Co. (Coarse).....	22,300	
NOV. 13.—By the <i>Lucania</i> =Liverpool:		
Albert T. Morse & Co. (Coarse).....	26,300	
George A. Alden & Co. (Coarse).....	5,900	
Crude Rubber Co. (Coarse).....	5,500	
Reimers & Meyer (Fine).....	9,300	
William Wright & Co. (Coarse).....	5,000	52,000
NOV. 13.—By the <i>La Gasconne</i> =Havre:		
Albert T. Morse & Co. (Cauch).....	42,500	
NOV. 16.—By the <i>Majestic</i> =Liverpool:		
Albert T. Morse & Co. (Coarse).....	8,500	
NOV. 17.—By the <i>Georgie</i> =Liverpool:		
Albert T. Morse & Co. (Coarse).....	7,800	
NOV. 20.—By the <i>Etruria</i> =Liverpool:		
George A. Alden & Co. (Coarse).....	2,600	
Crude Rubber Co. (Coarse).....	2,600	
Albert T. Morse & Co. (Coarse).....	1,500	6,700
NOV. 20.—By the <i>La Bretagne</i> =Havre:		
Albert T. Morse & Co. (Coarse and Cauch).....	63,000	
George A. Alden & Co. (Coarse).....	6,500	
Crude Rubber Co. (Coarse).....	6,500	76,000
NOV. 22.—By the <i>Cymric</i> =Liverpool:		
Albert T. Morse & Co. (Cauch).....	11,500	

OTHER ARRIVALS AT NEW YORK.

CENTRALS.

POUNDS.		
OCT. 23.—By the <i>Altai</i> =Greytown:		
A. P. Strout.....	7,500	
Andreas & Co.....	3,000	
A. D. Straus & Co.....	1,100	
Kunhardt & Co.....	7,500	
Samper & Co.....	1,500	
Munoz & Espriella.....	1,300	
Punderford & Co.....	700	
J. Venogochia.....	800	
Cardenas & Co.....	400	
For London.....	1,700	25,400
OCT. 23.—By the <i>Etruria</i> =Liverpool:		
Reimers & Meyer.....	6,500	
OCT. 24.—By the <i>Niagara</i> =Mexico:		
H. Marquardt & Co.....	2,000	
Flint, Eddy & Co.....	500	
J. W. Wilson & Co.....	200	2,700
OCT. 31.—By the <i>El Norte</i> =New Orleans:		
Albert T. Morse & Co.....	2,100	
K. Mandell & Co.....	500	2,600
OCT. 28.—By the <i>Advances</i> =Colon:		
G. Amsinck & Co.....	6,558	
Flint, Eddy & Co.....	2,790	
Markt & Co.....	3,916	
Piza, Nephews & Co.....	1,840	
Ellinger Bros.....	673	
De Sola Lobo & Co.....	521	
Roldan & Van Sichel.....	450	
Lazard Freres.....	406	
Eggers & Heinlein.....	310	
Isaac Brandon & Bros.....	407	
Munoz & Espriella.....	126	11,807
OCT. 27.—By the <i>Fluminense</i> =Ceará:		
G. Amsinck & Co.....	1,100	
OCT. 27.—By the <i>Patria</i> =Hamburg:		
Reimers & Meyer.....	4,400	
OCT. 28.—By the <i>Campania</i> =Liverpool:		
Reimers & Meyer.....	6,500	
OCT. 30.—By the <i>Grenda</i> =Trinidad:		
Thebaud Brothers.....	500	
Kunhardt & Co.....	500	1,000
OCT. 30.—By the <i>El Dorado</i> =New Orleans:		
Albert T. Morse & Co.....	17,000	
A. Lehman & Co.....	500	17,500
OCT. 30.—By the <i>Vigilancia</i> =Mexico:		
Thebaud Brothers.....	5,000	
H. W. Peabody & Co.....	3,000	

Jose Agostini.....	1,000	
H. Marquardt & Co.....	800	9,500
OCT. 31.—By the <i>Adirondack</i> =Cartagena:		
Roldan & Van Sichel.....	3,000	
Munoz & Espriella.....	2,500	
Flint, Eddy & Co.....	2,000	
Punderford & Co.....	1,500	
Kunhardt & Co.....	2,100	
Jimenez & Escobar.....	1,000	
H. W. Peabody & Co.....	800	
Gutterman, Rosenfeld & Co.....	800	
Samper & Co.....	800	
W. H. Crossman & Bro.....	500	
For London.....	3,500	
For Hamburg.....	1,500	20,000
NOV. 2.—By the <i>Thema</i> =Cape Gracias:		
Eggers & Heinlein.....	20,000	
Jimenez & Escobar.....	3,600	
Meyer & Langes.....	2,000	
Pomares & Cushman.....	700	
A. B. Lascelles & Co.....	700	
K. Mandell & Co.....	300	26,700
NOV. 3.—By the <i>Segurana</i> =Mexico:		
H. Marquardt & Co.....	1,700	
E. Nelson Tibbals.....	200	
Whitman & Barnes.....	200	
J. W. Wuppermann.....	200	2,300
NOV. 4.—By the <i>Algiers</i> =New Orleans:		
Albert T. Morse & Co.....	2,500	
Eggers & Heinlein.....	1,000	
K. Mandell & Co.....	500	4,000
NOV. 4.—By the <i>Mozart</i> =Pernambuco:		
A. D. Hitch.....	8,500	
L. Johnson & Co.....	2,200	10,700
NOV. 4.—By the <i>Patricia</i> =Hamburg:		
Reimers & Meyer.....	2,600	
NOV. 6.—By the <i>St. Paul</i> =Southampton:		
J. H. Rossbach & Bro.....	15,000	
Reimers & Meyer.....	3,000	
L. Johnson & Co.....	4,700	22,700
NOV. 8.—By the <i>Alene</i> =Greytown:		
A. P. Strout.....	9,000	
Kunhardt & Co.....	2,700	
Samper & Co.....	2,500	
D. A. De Lima & Co.....	1,500	
Flint, Eddy & Co.....	1,200	
Andreas & Co.....	1,000	
A. N. Rotholz.....	1,000	
Roldan & Van Sichel.....	400	
Punderford & Co.....	200	
Cadenas & Coe.....	300	
J. Ferro.....	200	
For Hamburg.....	2,000	22,000
NOV. 8.—By the <i>Louisiana</i> =New Orleans:		
A. N. Rotholz & Co.....	3,000	
NOV. 9.—By the <i>Oceanic</i> =Liverpool:		
Reimers & Meyer.....	3,300	
NOV. 10.—By the <i>Phenicia</i> =Hamburg:		
Livesey & Co.....	6,500	
NOV. 10.—By the <i>Cervic</i> =Liverpool:		
Reimers & Meyer.....	5,500	
NOV. 13.—By the <i>Yucatan</i> =Mexico:		
H. Marquardt & Co.....	1,500	
F. Probst & Co.....	1,000	2,500
NOV. 13.—By the <i>Irawaddy</i> =Trinidad:		
Punderford & Co.....	700	
Kunhardt & Co.....	600	
Thebaud Brothers.....	300	
Mecke & Co.....	100	1,700
NOV. 14.—By the <i>Alghany</i> =Cartagena:		
Samper & Co.....	6,000	
Kunhardt & Co.....	5,500	
Roldan & Van Sichel.....	600	
Jimenez & Escobar.....	500	
Munoz & Espriella.....	300	
Kates & Bock.....	100	13,900
NOV. 15.—By the <i>El Norte</i> =New Orleans:		
Albert T. Morse & Co.....	9,000	
NOV. 15.—By the <i>Alliance</i> =Colon:		
Czarnikow McDougal & Co.....	20,503	
A. Santos & Co.....	19,210	
Flint, Eddy & Co.....	12,893	
Hirzel, Feltman & Co.....	12,574	
G. Amsinck & Co.....	10,698	
Dumarest & Co.....	9,865	
Lanman & Kemp.....	6,448	
I. Brandon & Bros.....	5,511	
W. Loazia & Co.....	3,941	
H. Marquardt & Co.....	4,635	
Eggers & Heinlein.....	3,465	
Crude Rubber Co.....	3,330	
Bowers Rubber Co.....	3,500	
A. P. Strout.....	2,347	
W. R. Grace & Co.....	2,657	
Markt & Co.....	3,007	
Kunhardt & Co.....	3,007	

Roldan & Van Sichel.....	2,896	
J. Aparicio & Co.....	1,415	
A. M. Capen's Son.....	2,651	
Otto Gerdall.....	1,065	
Lawrence Johnson & Co.....	1,029	
F. Probst & Co.....	851	
Ellinger Brothers.....	825	
W. H. Crossman & Bros.....	356	
Ellenhorst & Co.....	501	
J. W. Wuppermann.....	597	
Samper & Co.....	830	
Ascensio & Cassio.....	245	
Jimenez & Escobar.....	415	
A. F. Townsend.....	573	
R. G. Bartholz.....	45	141,500
NOV. 17.—By the <i>Cvy of Washington</i> =Mexico:		
E. N. Tibbals.....	700	
J. W. Wilson & Co.....	600	
H. Marquardt & Co.....	200	1,500
NOV. 18.—By the <i>Pennsylvania</i> =Hamburg:		
Reimers & Meyer.....	17,000	
NOV. 20.—By the <i>St. Louis</i> =Southampton:		
J. H. Rossbach & Bros.....	25,000	
Reimers & Meyer.....	2,000	27,000
NOV. 20.—By the <i>Altai</i> =Greytown:		
A. P. Strout.....	2,500	
Andreas & Co.....	1,800	
For London.....	1,500	
W. H. Crossman & Bros.....	1,000	
Gutterman, Rosenfeld & Co.....	1,000	
For Hamburg.....	700	
A. D. Straus & Co.....	500	9,000
NOV. 20.—By the <i>Seneca</i> =Mexico:		
E. Steiger & Co.....	5,500	
J. E. Ward & Co.....	3,000	
F. Mathieson & Co.....	1,000	9,500
NOV. 22.—By the <i>Hudson</i> =New Orleans:		
Albert T. Morse & Co.....	5,200	
NOV. 22.—By the <i>Advances</i> =Colon:		
Bowers Rubber Co.....	4,100	
Roldan & Van Sichel.....	1,490	
Piza Nephews & Co.....	1,530	
D. H. Carrington & Co.....	720	
J. J. Townsend.....	600	
Samper & Co.....	480	
Lauman & Kemp.....	230	
A. M. Capen Sons.....	250	9,400
NOV. 23.—By the <i>Ellis</i> =Colon:		
Czarnikow McDougal & Co.....	8,100	
Hirzel Feltman & Co.....	5,100	
Isaac Brandon & Bros.....	5,660	
Crude Rubber Co.....	3,500	
Roldan & Van Sichel.....	2,900	
G. Amsinck & Co.....	2,200	
Eggers & Heinlein.....	2,400	
Flint, Eddy & Co.....	1,880	
D. N. Carrington & Co.....	230	
Andreas & Co.....	130	32,100
AFRICANS.		
POUNDS.		
OCT. 23.—By the <i>Etruria</i> =Liverpool:		
Reimers & Meyer.....	18,000	
Otto G. Mayer & Co.....	20,600	
George A. Alden & Co.....	11,600	
Crude Rubber Co.....	12,000	
Livesey & Co.....	11,800	
William Wright & Co.....	4,600	87,000
OCT. 24.—By the <i>Tauric</i> =Liverpool:		
George A. Alden & Co.....	15,500	
Crude Rubber Co.....	11,500	27,000
OCT. 25.—By the <i>Teutonic</i> =Liverpool:		
Albert T. Morse & Co.....	4,500	
OCT. 25.—By the <i>Noordland</i> =Antwerp:		
A. T. Morse & Co.....	11,000	
OCT. 28.—By the <i>Manhattan</i> =London:		
George A. Alden & Co.....	6,000	
Crude Rubber Co.....	6,000	12,000
OCT. 27.—By the <i>Patria</i> =Hamburg:		
Geo. A. Alden & Co.....	8,300	
Reimers & Meyer.....	8,500	16,800
OCT. 28.—By the <i>Campania</i> =Liverpool:		
George A. Alden & Co.....	12,000	
Crude Rubber Co.....	12,000	
Reimers & Meyer.....	2,300	
William Wright & Co.....	10,200	
Livesey & Co.....	5,900	42,400
NOV. 4.—By the <i>Patricia</i> =Hamburg:		
Reimers & Meyer.....	10,000	
Livesey & Co.....	11,900	21,500
NOV. 6.—By the <i>Umbra</i> =Liverpool:		
George A. Alden & Co.....	6,700	
Crude Rubber Co.....	6,700	
Otto G. Mayer & Co.....	1,300	
Livesey & Co.....	2,900	17,600

Nov. 8.—By the <i>Oceanic</i> =Liverpool:		
Reimers & Meyer.....	22,000	
George A. Alden & Co.....	10,000	
Crude Rubber Co.....	10,000	
Livesey & Co.....	3,900	45,900
Nov. 9.—By the <i>Southwark</i> =Antwerp:		
Albert T. Morse & Co.....	14,000	
Reimers & Meyer.....	7,800	
William Wright & Co.....	2,000	23,800
Nov. 10.—By the <i>Cerie</i> =Liverpool:		
Reimers & Meyer.....	16,500	
Otto G. Mayer & Co.....	11,200	
George A. Alden & Co.....	5,600	
Crude Rubber Co.....	5,600	
Livesey & Co.....	1,500	39,800
Nov. 13.—By the <i>Lucania</i> =Liverpool:		
George A. Alden & Co.....	14,400	
Crude Rubber Co.....	11,100	
Livesey & Co.....	6,500	32,000
Nov. 13.—By the <i>Graf Waldersee</i> =Hamburg:		
Otto G. Mayer & Co.....	5,300	
Nov. 14.—By the <i>Statendam</i> =Rotterdam:		
Otto G. Mayer & Co.....	21,000	
Nov. 16.—By the <i>Majestic</i> =Liverpool:		
George A. Alden & Co.....	23,000	
Crude Rubber Co.....	23,000	
Albert T. Morse & Co.....	3,500	49,500
Nov. 18.—By the <i>Pennsylvania</i> =Hamburg:		
Reimers & Meyer.....	16,000	
Albert T. Morse & Co.....	15,000	
Otto G. Mayer & Co.....	11,500	
Livesey & Co.....	9,500	
Crude Rubber Co.....	3,200	
George A. Alden & Co.....	3,100	58,300
Nov. 20.—By the <i>Etruria</i> =Liverpool:		
Albert T. Morse & Co.....	6,000	
Reimers & Meyer.....	7,500	
Livesey & Co.....	2,500	16,000
Nov. 20.—By the <i>Mansdam</i> =Rotterdam:		
Otto G. Mayer & Co.....	8,500	
Nov. 22.—By the <i>Kensington</i> =Antwerp:		
Reimers & Meyer.....	90,000	
Albert T. Morse & Co.....	50,000	
George A. Alden & Co.....	1,200	
Crude Rubber Co.....	1,100	142,300
Nov. 22.—By the <i>Teutonic</i> =Liverpool:		
Otto G. Mayer & Co.....	25,000	
Joseph Cantor.....	2,500	
Robert Crooks & Co.....	1,500	29,000

EAST INDIAN.		POUNDS.
Oct. 24.—By the <i>Georgian</i> =London:		
Crude Rubber Co.....	1,500	
Oct. 24.—By the <i>Tauric</i> =Liverpool:		
Reimers & Meyer.....	9,400	
Nov. 6.—By the <i>St. Paul</i> =Southampton:		
Reimers & Meyer.....	3,000	
Nov. 16.—By the <i>Manitou</i> =London:		
Otto G. Mayer & Co.....	3,000	
Nov. 16.—By the <i>Pisa</i> =Singapore:		
Reimers & Meyer.....	11,200	
J. W. Greene & Co.....	6,800	18,000
GUTTA-PERCHA, BALATA, ETC.		
Oct. 23.—By the <i>Indralena</i> =Singapore:		
James W. Phyle & Co. (Pontianak).....	60,000	
Oct. 24.—By the <i>Georgian</i> =London:		
Lamb Mfg. Co. (Gutta-percha).....	3,000	
Oct. 27.—By the <i>Patria</i> =Hamburg:		
Geo. A. Alden & Co. (Gutta-percha).....	2,200	
Nov. 4.—By the <i>Patricia</i> =Hamburg:		
R. Soltan & Co. (Gutta-percha).....	15,000	
Nov. 6.—By the <i>Mesaba</i> =London:		
Lamb Mfg. Co. (Gutta-percha).....	3,000	
Nov. 13.—By the <i>Graf Waldersee</i> =Hamburg:		
Geo. A. Alden & Co. (Gutta-percha).....	2,500	
Nov. 13.—By the <i>Irrawaddy</i> =Trinidad:		
Flint, Eddy & Co. (Balata).....	1,000	
Nov. 16.—By the <i>Pisa</i> =Singapore:		
Reimers & Meyer (Pontianak).....	625,000	
J. W. Greene & Co. (Pontianak).....	80,000	
James W. Phyle & Co. (Pontianak).....	16,978	
George A. Alden & Co. (Pontianak).....	6,000	778,000
Nov. 22.—By the <i>Moumence</i> =London:		
Lamb Mfg. Co. (Gutta-percha).....	3,060	
CUSTOM HOUSE FIGURES.		
PORT OF NEW YORK—OCTOBER.		
Imports:	POUNDS.	VALUE.
India-rubber.....	4,490,961	\$2,812,587
Gutta-percha.....	16,978	13,963
Gutta-jelatang (Pontianak).....	56,180	1,157
Total.....	4,564,119	\$2,827,707
Exports:		
India-rubber.....	12,428	\$6,943
Reclaimed rubber.....	85,688	9,211

BOSTON ARRIVALS.		POUNDS.
Oct. 2.—By the <i>Corinthia</i> =Liverpool:		
Reimers & Meyer.—Africans.....	11,600	
Reimers & Meyer.—Fine Para.....	18,000	
Oct. 3.—By the <i>Oakmore</i> =London:		
Reimers & Meyer.—East Indian.....	2,200	
Oct. 4.—By the <i>Bostonian</i> =London:		
George A. Alden & Co.—East Indian.....	2,000	
Crude Rubber Co.—East Indian.....	2,000	
Oct. 10.—By the <i>English King</i> =Antwerp:		
George A. Alden & Co.—Africans.....	1,300	
Crude Rubber Co.—Africans.....	1,200	
Oct. 11.—By the <i>Michigan</i> =Liverpool:		
Reimers & Meyer.—Fine Para.....	23,300	
Oct. 16.—By the <i>Cambrian</i> =London:		
Reimers & Meyer.—East Indian.....	14,600	
Oct. 17.—By the <i>Sachem</i> =Liverpool:		
Reimers & Meyer.—Africans.....	6,500	
Oct. 17.—By the <i>H. F. Dimock</i> =New York:		
Reimers & Meyer.—Africans.....	55,100	
Oct. 18.—By the <i>Barroemore</i> =London:		
George A. Alden & Co.—East Indian.....	11,800	
Crude Rubber Co.—East Indian.....	11,400	
Oct. 23.—By the <i>Sagamore</i> =Liverpool:		
Reimers & Meyer.—Africans.....	11,300	
Oct. 25.—By the <i>Athens</i> =Hamburg:		
George A. Alden & Co.—Africans.....	6,800	
George A. Alden & Co.—East Indian.....	9,700	
Oct. 28.—By the <i>British Trader</i> =London:		
George A. Alden & Co.—East Indian.....	1,500	
POUNDS. VALUE.		
Total for October.....	190,300	\$149,201
Total for September.....	172,963	109,975
Total for August.....	249,141	162,947
Total for July.....	142,954	89,686
Total for June.....	47,404	25,231
Total for May.....	71,493	47,317
Total for April.....	204,780	119,618
Total for March.....	80,170	51,945
Total for February.....	317,936	197,523
Total for January.....	247,345	147,488
GUTTA-PERCHA.		
Oct. 2.—By the <i>Oakmore</i> =London:		
Reimers & Meyer.—Gutta-percha.....	1,100	1,115

OCTOBER EXPORTS OF INDIA-RUBBER FROM PARA (KILOGRAMS.)

EXPORTERS.	UNITED STATES.					EUROPE.					TOTAL.
	FINE.	MEDIUM.	COARSE.	CAUCHO.	TOTAL.	FINE.	MEDIUM.	COARSE.	CAUCHO.	TOTAL.	
Frank da Costa & Co.	117,526	13,490	100,924	300	232,240	102,318	11,724	71,084	790	185,916	418,156
Adelbert H. Alden.....	210,200	40,370	81,520	1,860	333,950	14,760	1,260	9,610	—	25,630	359,580
Pusielli, Prüsse & Co.....	70,210	38,420	78,340	10,700	197,670	102,850	11,220	29,200	—	143,270	340,940
Rudolf Zietz.....	18,416	2,277	18,010	—	38,703	66,096	6,946	37,896	—	110,938	149,641
The Sears Pará Rubber Co.....	83,810	12,580	39,290	—	135,680	—	—	—	—	—	135,680
Denis Crouan & Co.....	—	—	21,060	—	21,060	13,600	1,190	14,400	—	29,190	50,250
H. A. Astlett.....	27,343	3,214	5,897	—	36,454	—	—	—	—	—	36,454
R. Suarez & Co.....	—	—	—	—	—	21,079	5,593	4,985	—	31,657	31,657
York Lajeunesse & Co.....	—	—	—	—	—	15,948	1,872	3,089	1,114	22,023	22,023
Kanthack & Co.....	—	—	—	—	—	4,120	170	6,576	—	10,866	10,866
Singlehurst, Brocklehurst & Co	—	—	—	—	—	3,040	1,232	2,144	—	6,416	6,416
Pires, Teixeira & Co.....	2,280	—	1,000	—	3,280	—	—	—	—	—	3,280
Sundry small shippers.....	23,460	4,250	8,700	—	36,410	6,083	850	322	—	7,255	43,665
Direct from Iquitos.....	—	—	—	—	—	18,221	4,057	35,257	20,954	78,489	78,489
Direct from Manáos.....	63,363	13,646	16,491	2,123	95,623	206,443	35,619	51,882	9,221	303,165	398,788
Total.....	616,608	128,247	371,232	14,983	1,131,070	574,558	81,733	266,445	32,079	954,815	2,085,885

MONTHS.	UNITED STATES.				MONTHS.	EUROPE.			
	United States	England.	Continent.	Total.		From Iquitos.	From Manáos.	From Pará.	Total.
January-June.....	8,085,867	4,948,253	1,459,474	14,493,594	January-June	455,673	4,595,843	9,442,078	14,493,594
July.....	348,184	588,119	183,917	1,120,220	July.....	107,079	186,621	826,520	1,120,220
August.....	520,975	534,666	127,038	1,182,679	August.....	—	198,271	984,408	1,182,679
September.....	741,658	555,697	64,507	1,361,922	September.....	—	278,202	1,063,720	1,361,922
Total for 1899.....	9,696,684	6,626,735	1,834,990	18,158,415	Total for 1899.....	662,752	5,278,937	12,316,726	18,158,415

899.

UNDS.

1,600
18,000

2,200

2,000
2,000

1,300
1,200

23,300

14,600

6,500

55,100

11,800
11,400

11,300

6,800
9,700

1,500

ALUM.

49,201

39,975

82,947

89,686

25,231

47,317

19,618

51,945

97,523

47,488

1,115

AL.

3,156

9,580

9,940

9,641

9,680

9,250

9,454

9,657

9,023

9,866

9,416

9,280

9,665

9,480

9,788

9,885

9,594

9,220

9,679

9,922

9,415